

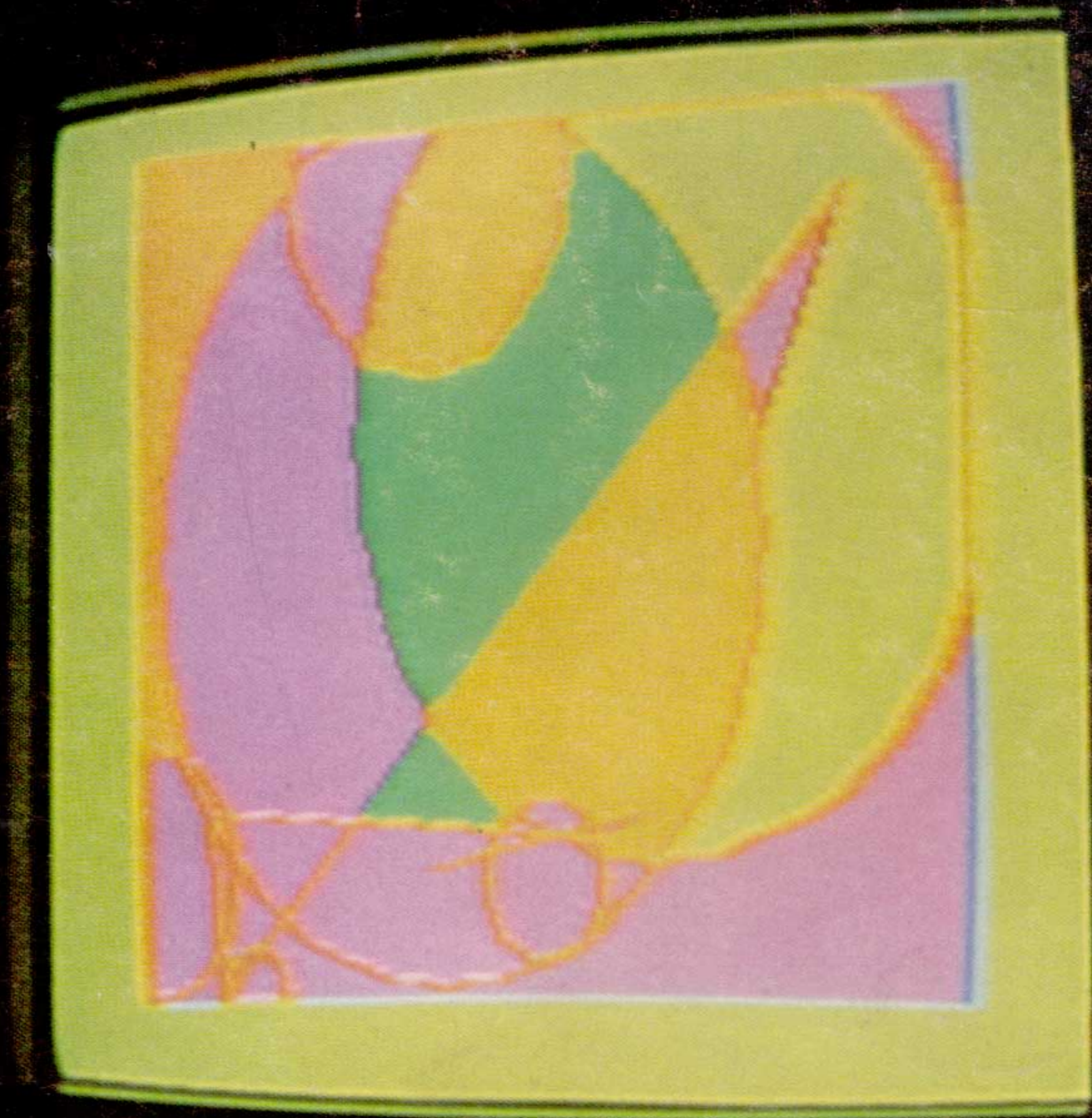
# 80 U.S.

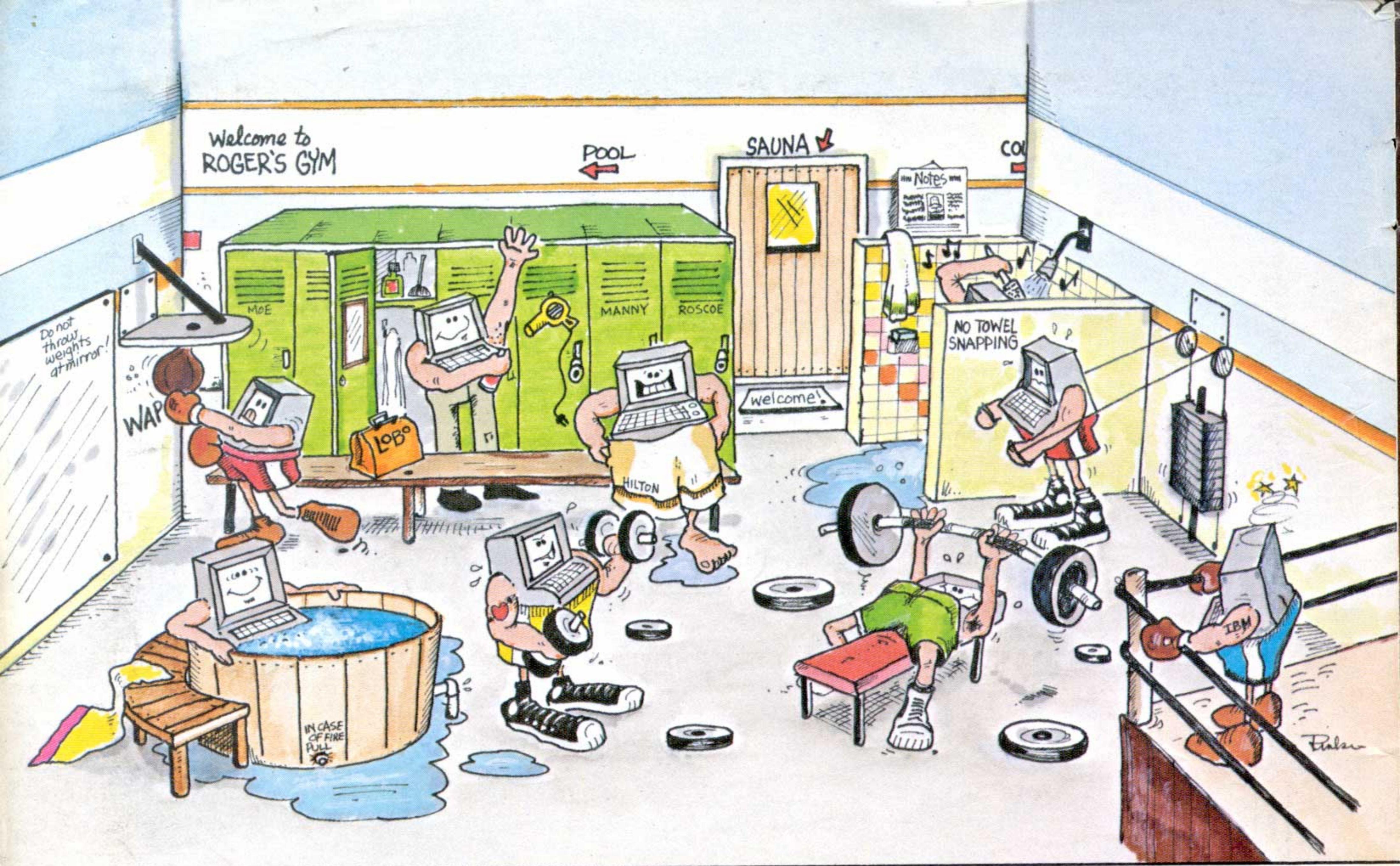
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THE TRS-80 USERS JOURNAL

Jul/Aug 1981

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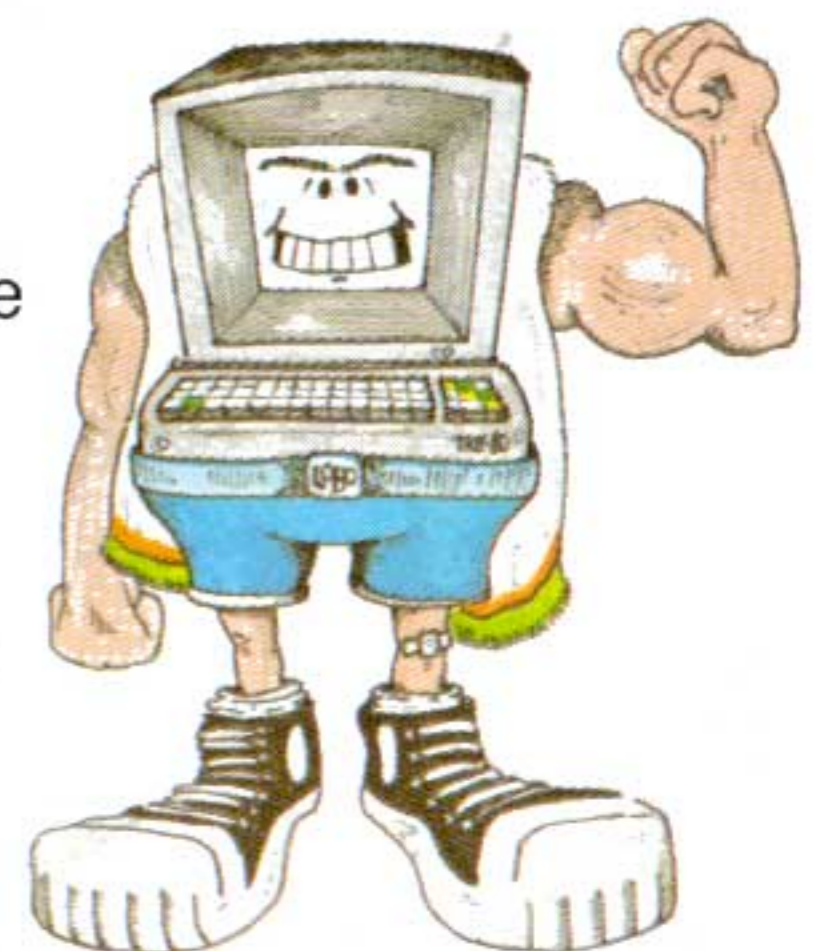
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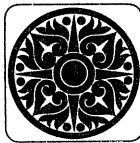
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July 1981						
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August 1981						
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Product evaluations have become increasingly valuable to our industry. They have been around a long time in other markets: audio, auto, photo, etc., and they have played a very important part.

It is the audio industry which appears most like our own: we both have hardware - receivers and computers, speakers and printers, turntables and diskdrives; software - records and tapes with music and other sound programs, diskettes and cassettes with games, utilities, and applications programs; and media - raw tapes and record vinyl and blank disks and tapes. And, like the audio industry, ours pours forth new products by the hundreds and thousands every year. Some are good, some bad and some - hard to describe.

All of this production places a burden of responsibility on the editorial staff of the magazines which support our hobby, business, or necessity. And, in doing evaluations, none of us are prepared to do the job adequately. Nor are we likely to do so in the very near future.

One reason for this is the diversification of the microcomputer industry. Even if we stayed with just one model, like the Model II, the field is too broad. Even the Tandy Corporation, granddaddy of the home microcomputer, has a large staff devoted to doing just one thing, evaluation.

For every piece of application software, a segment of the industry exists. An example is the VISICALC user group and supportive publication. Other major application packages could also benefit from similar groups: Scripsit, DBM systems, Communications, Math, History, the arts in schools; languages like FORTH, LISP, PASCAL, Level II Basic, Disk Basic, FORTRAN, COBOL - the list goes on.

We, as an industry, have never established an independent group of professional evaluators, like the Hirsch-Houck Lab of the audio industry. Anyone who has watched the development of this lab over the decades (yes, *tens* of years) will realize that it cannot be done overnight.

Our industry is the fastest moving consumer industry in existence. Since the stereo record was introduced in the fall of 1957, the audio industry has seen the cassette, FM-stereo, and noise reduction systems as major innovative advances. The rest has been a refinement of the state of the art. In the same time span, however, our industry has seen major advances in every area, from the electronics (transistor, integrated circuit, single-chip CPU) to printers (high speed dot matrix, ink jet, and thermal). And this doesn't cover things like

video displays, floppy disks and semi-conductor memory. On the horizon we are looking towards flat screen displays, copier-printers, bubble memory, the video disk, and others.

On top of that add the fact that other than Radio Shack, not one manufacturer has produced anywhere near the number of consumer products and accessories as a typical audio company. In addition, most products are not directly compatible or comparable. Benchmark tests between Apple and TRS-80 are meaningless because they operate so differently and have such difference in design philosophies.

This is a most incompatible industry. While you can hook up just anybody's turntable to anyone's receiver, you can't mate an Apple disk drive to a TRS-80 Model II; or a Model II drive to a Model I or III, for that matter. The audio industry isn't like that. Go into a local stereo shop and look at all the different brands of receivers, speakers, tape decks and turntables. All are totally compatible!

So where does the computer industry stand? At best we are ready to do only a limited job on hardware and a fair job on software.

For instance, where are power consumption measurements for the hardware? And where are measurements of heat output, performance under various conditions like temperature and voltage fluctuations? How about RF radiation, speed, power supply stability, serviceability, maintenance agreements, mean time between failure, and so on? Are these really necessary? Is safety a factor and should you know that many micros don't even carry U.L. Labels? How good is the documentation, the factory support, and so on?

Most software evaluations come from users who are ill-equipped to do the job adequately. Sure, games are easy and fun. That's why you see so many of them reviewed. Utilities are also great and if one catches a user's eye and he writes a good review, it will get published. But what about practical applications? Like Accounts Receivable, General Ledger, and so on? Who is to say that a particular general ledger package will do the job for a doctor? A school administrator? Not likely. And visa-versa. Even non-committal evaluations don't always do the job without extensive charts and testing.

Will evaluations improve? We certainly think so and we hope we are on the right track.

Tom

# 80 U.S. JOURNAL

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**Authors:** We constantly seek material from contributors. Send your material (double spaced, upper/lower case please) and allow approximately 4 weeks for review. Programs must be supplied in machine readable format on disk or tape. Text files may be on diskette. Media will be returned if return postage is provided. Cartoons and photographs are welcome. Generous compensation will be made for non-trivial works which are accepted for publication. The Journal pays on acceptance rather than on publication.

#### The Cover

Our cover this issue shows model Andrea Angeline viewing the Color Computer. The computer screen was the only light source for this photograph. Frederick A Johnsen is the photographer.

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# 80-U.S.

## THE TRS-80 USERS JOURNAL

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Volume IV Number 4 July/August 1981

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# LETTERS LETTERS

I am in the process of devouring your Mar/Apr 81 issue and loving it! I would like to pass on a correction for John Junod's "Computer Yahtzee" program and a comment on programs you list.

If you take a -1 for a roll the computer will not add this into your total score until you get some positive points. If you have to take a -1 for your last turns your final score will not be correct. What I did was change line 490 to read: 490 GOTO 520. This will cause the computer to immediately add up your total score no matter what kind of points you get, positive or negative. The program was fantastic. (Reading it without spaces in the listing was a bear!!!)

Why don't you as a magazine request program listings to be submitted in an easy to read format, WITH SPACES!?!?! I'd like to do your \$urvival program but I'm not up to staring at another listing for awhile.

Until next issue, keep on keeping on.

Dave Bower  
Virginia Beach, VA

I am a TRS-80 owner with two disk drives. I have been reading articles about 40 track disk drives. I also have been reviewing articles about SUPERZAP. My reason for this letter is my interest in getting the use of the five extra tracks. Is it possible through the use of SUPERZAP to modify TRSDOS 2.2 to use these tracks? If so could you do an article on the subject or at least tell what programs have to be changed?

I like your publication very much and look forward to its arrival. You tend to present more useful information to the home computer bug than other publications.

Ken Weidmann  
Newbury Park, CA

*Most people who obtain SUPERZAP do so with a version of the NEWDOS operating system. While the machine language version does not require NEWDOS, the Basic versions do and as such you will end up with a DOS which will support the 40 track capability. -Ed*

I have recently purchased an "In-Memory Information Package", Model 26-1501, from Radio Shack and have come upon a problem I'd like to make other TRS-80 users aware of. When you write your data on the data tape that comes with the package, it may start on the leader for the tape and void the whole program. I discovered this after spending 2½ hours entering data on that tape.

Radio Shack specifically states that you must use leaderless tapes, so why do they supply leadered tapes with their software packages?

William R. Alsing  
St Louis, MO

*Whenever you use ANY tape, leaderless or not, it is a good idea to run it in to a count of 5 or 10 past any possible tape that has been improperly handled during assembly. This has always insured good results on good tape. -Ed*

I love my Electric Pencil, but I use Scripsit for my word processing. However, having put the "Electric Pencil Lowercase modification" in my TRS-80 before there even was a Scripsit, I have a perfectly good control key that Scripsit doesn't use. I'm tired of using the "@" sign for a control key. Has anyone patched Scripsit to use the Pencil control key? If they have, I would appreciate hearing how to go about it.

John T Phillipp  
Brooklyn, NY

Looking through the Mar/Apr 81 issue, I noticed the article "System/Command". In general, it was rather informative. One thing was left out though.

This has to do with the address 0249 and 0250, which deal with the timing during tape read operations. Phil Pilgrim mentioned that the change (0249 was 41, now is 60 and 0250 was 76 now is 85) allowed marginal cassettes to be read easier. That may be true, but the Radio Shack Editor/Assembler would no longer load!

Thankfully, Radio Shack has a cure for this. By taking your old copy to one of their computer centers, they will modify your old version to operate with the new Level II ROM's. Whether or not Radio Shack has a mail-in version of this modification is unknown to me, but you might check with them.

Hope this may help some of your readers. Keep up the great publication you have.

Paul Scanlon  
Van Nuys, CA

*Radio Shack's Tape Editor/Assembler and several other programs were duplicated out of phase. This created havoc with the new ROM routines. As a result, you may take your old original tape to any Radio Shack company store and they are supposed to mail it to Ft Worth for replacement. However, if you own one of*

*the tape duplication programs, you may do this yourself by simply creating a new copy of the original. This may be done on a machine with the old ROM. -Ed*

I finally have found enough time to type in Phil Pilgrim's "KEYQ" program (System/Command, Nov/Dec 80) and discovered it provides us non-disk owners with a way to have the computer load, run, and pass any variables to a program (if you know the correct order) automatically.

Let's say you had promised friends to run your loan program for them, but they are at the door and you don't wish to be stuck at the keyboard. With "KEYQ" active, here is all you need to do:

Put the CPU in the halt state by typing the SHIFT@. Then push the CLEAR key followed by ENTER. Then type CLOAD"X" (where X is the program name) ENTER; RUN; ENTER and then the necessary values (each followed by an ENTER).

When done, unhalt the CPU by pressing SHIFT@. The screen will clear then print CLOAD"X" and the tape starts moving. When the computer finds your program it will load it and run it while you enjoy the company and a cool beer.

The CLEAR key must be entered first as it removes the two @ symbols you generate halting and unhalting the computer. If they remain there, you end up with a syntax error since @@CLOAD is meaningless.

By the way, I think Grace McNamara does a superb job in the layout/design department. It sets your magazine well above the others.

Thomas M Cost  
Lawton, OK

*Thank you for the fine suggestions. Grace McNamara works very hard with layout/design and thanks you for recognizing that effort. -Ed*

I take exception to M Barlow's Mar/Apr 81 criticism of Cameron Brown's review of Versafile (Sep/Oct 80). Why should Versafile run on powerup? Nothing else does, except TRSDOS sometimes. Global Search and Multiple Kill are derided as jargon. Of all "Computerese" these are two phrases that do make sense to a novice.

Then you condone Barlow's criticism by apparently referring to his mother-in-law's inability to read eight pages of "big print and pictures" instructions as sophistication. Shame on you.

I bought Versafile on the strength of Cameron Brown's review and have enjoyed using it very much. Why haven't there been corrections to Mike Zielinski's

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article on improving Versafile? Doesn't anybody else use it? Several typographical errors are included in the additional lines in the text of the article and some things don't work at all. For instance I get an Illegal Function error in 8070. Maybe your readers are all so unsophisticated they can correct the errors without your help.

Brian K Wood  
Loma, MT

*Maybe you're right. But, we have had no problem with Zielinski's additions (Jan/Feb 81) at this end. -Ed*

From what I've seen of your magazine you don't have a regular question and answer column. If you did I could single-handedly keep it full of questions. Here are a few:

Why can't I RENAME Scripsit?

How do you COPY full non-systems disk with two drives?

When does Radio Shack's ULCDVR/CMD cause problems? How do I get it to work with NEWDOS?

Speaking of NEWDOS, when will Apparat quit their boasting and get around to writing some adequate documentation? (Note that I only ask for adequate, not good documentation.)

Does anyone give awards for insufferable documentation? I nominate Racet. Has someone somewhere thoroughly explained their GSF and DOSORT? They could be fantastic utilities.

I assume that it is generally known now that TRSDOS will support variable length records. I've experimented with it and, indeed, it does work. But I've been afraid to use it on valuable data. I would appreciate a report by someone who has used this "secret" feature without fear and trembling. Do you know someone?

Has your magazine already answered these questions?

Jerry George  
Bainbridge Island, WA

No.

*Scripsit on the Model I can be renamed to any name you want. Just don't forget the /CMD extension. I use SSL/CMD, and type in SSL to bring up Scripsit.*

*The TRSDOS BACKUP utility is completely self prompting. So once it is in the system, you may make backups of nonsystem disks.*

*I am unaware of any ULCDVR/CMD problems other than the lower case keyboard does not always work with some machine language programs, such as early NEWDOS operating systems.*

*As far as documentation goes, the industry has to realize they need to write for people who know little or nothing about the computer they are using. Then, and*

*only then, will the documentation improve. -Ed*

First excuse my bad English. I passed the school 20 years ago.

In your Nov/Dec 80 issue, page 6 in the right column you brought very good things for the Microline. The best of all POKE 17360,255. That's a big help. Thanks!

My question: Do you know what to do in NEWDOS80 and VTOS 3.04 to print the graphics with the Microline?

Gerhard Seiler  
W Germany

*The NEWDOS80 system command, SYSTEM AK=Y, will allow graphics to be sent to the Microline with the JKL feature. -Ed*

Regarding your LLIST/CMD article on page 47 of the Nov/Dec 80 issue, could you expand a bit how to invoke the formatting routine? I believe it should be automatic since it patches into the DCB driver address. However, whenever I load it and try to LLIST or LPRINT, I find myself confronted with the old "Silent Death".

I am relatively new to disk operation and I don't understand everything I know about its workings. Although I'm probably missing something obvious, I need help to see it, so - Help! Any assistance will be appreciated.

Other than this problem, I enjoy 80-U.S. very much. Keep up the good work.

James H Fox  
Afton, MN

*The answer lies in your assembled code, which you need to recheck against the magazine listings. You are right, the routine is invoked whenever LLIST or LPRINT is received. Are you trying to do this with a serial or parallel printer? From the sound of things, the program is running off into unknown places in memory and hiding. Make sure that your code directs the output to the printer port. -Ed*

Your magazine has really covered the Model I very well. I am looking forward to seeing the same coverage of the Color Computer's capabilities.

In particular, I would like to know if you have a set of values to poke into memory to speed up the computer or return it to normal. Another area I would like to see you cover is machine language on the MC6809. Also I would like to see a program to set up the computer with the Radio Shack DC Modem I as a smart terminal.

Tom Grumbling  
Fredericktown, OH

I purchased Microfiles from Radio Shack, which is a data management system program written in machine language. The program was written for Radio Shack by

Robert G Kilgus, whose address I do not have. My equipment is a TRS-80 Model I.

I find the program useful but it has one very serious weakness. There is no provision for performing simple arithmetic operations, such as addition, on any of the records in the file. If after sorting by class one could add the data in one set of records of the class, it would very greatly improve the usefulness of the program.

If someone has modified the program to perform this task I would gladly pay a royalty to use their work or if someone knows how the data is formatted/handled by the computer and would supply me the information, I would try to modify the program to do this task.

George A Downsborough  
1000 Fillmore Road  
State College, PA 16801

*While Microfiles is an excellent and efficient data handler, it uses its own file management and format. This is not secret, it is a variable length file and thus normally unaccessible from Basic. -Ed*

I own a Model I, Level II TRS-80. I am very happy with it in all aspects - but one. The graphics. I was wondering if you knew any way to get high resolution, color graphics for the TRS-80. I am sure many TRS-80 owners would be interested.

Nick Souleles  
Glenview, IL

*Without spending at least \$399 for the color computer, plus the cost of a color TV, the Model I, II and III are all designed to be black and white only. The Model II does have possibilities with a different video board, but the other two do not, except as an external device. Several have been marketed. -Ed*

Re: Computer Yahtzee. There is a problem in the data statement. The value of a large straight is 40, not 45. Line 90 should be 3,6,9,12,15,18,0,0,25,30,40,50,0.

Is there any computer scrabble game for a 16K Level II TRS-80 Model I computer?

Keith Haley  
Bellevue, MI

*We are currently evaluating a Scrabble game for possible future publication. -Ed*

I like your user journal very much - keep up the good work. The reason I'm writing you is this: I have a copy of NEWDOS80 and everything works wonderful, and I read the fine article about custom operating systems and really got a lot out of it.

The problem I'm having is that after I format drive one to 43 tracks NEWDOS80 SUPERZAP will not look past 40 tracks. I even tried to PDRIVE #1 or #0 drive to see if it would help but it didn't. Do you think you could help me? The drives are both Tandon drives from Radio Shack. NEWDOS80 does remember to format drive 0 or 1 to 40 tracks without telling it to, also if I copy



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from drive 0 to 1, typing in that there are 43 tracks, after copy is complete, DIR shows there are 43 tracks and 83 grans. NEWDOS80 will not fill the disk up past 40 tracks - it will come back and read DISK FULL even when DIR shows grans left.

Also tell F L Eskholme S W E D U M that if he would lubricate the two shafts the heads travel on, the noise will go away. (See Letters, May/June 81 issue). The way this is done is as follows:

1. Take cover off the disk by taking out four screws.
2. Get a "Q" tip swab.
3. Put some light machine oil on it.
4. Rub this on the shafts where heads are located.
5. Be careful not to use too much oil.

I had this same problem and this got rid of the noise.

Douglas Thielen  
Woodlands, TX

*Our drives are the older Shugart drives from Radio Shack, so we have been unable to chase your problem. Another letter in this issue talks about SUPERZAP/BAS getting past the 40th track. And thanks for the tip on noisy Tandon drives. By the way, keep that oil to an absolute minimum or you may find a gummy mess in the future. -Ed*

Herewith, about 6 months early, my subscription renewal. David Busch's tip in the May/June 81 issue that newer Radio Shack drives will accommodate a custom

designated 44 track NEWDOS80 diskette was worth a year's subscription alone! It works for DBLDOS too, yielding an extra 14 grans of space, and the Basic version of SUPERZAP can easily be modified to read a 77 track directory. Keep up the good work.

Now, what about somebody doing an article on how to make a program compatible with all the DOS systems on the market? Yes, it can be done - I'd just like to know how.

Michael M Finefrock, PhD  
Charleston, SC

*It probably can be done, but is it worth the effort? -Ed*

I really had a ball with the NFL-PIX program. I could see by the line numbers that it had been stripped down to fit into 16K. So I put back some of the bells and whistles. Especially the sort, so the standings would have the team with the most wins printed first. I have part of the coming schedule and as soon as I get the rest will be all set for next season. I wonder if it would be practical to have several versions of different core sizes, such as; stripped 16K and complete 32K. I use 48K and dislike getting a stripped program just so it will fit into 16K.

It is not possible for me to tell you how much I enjoy your magazine. I even read all the ads. You may rest assured that when I order something I mention that I read it in 80-U.S.

Please keep going and doing the same excellent job in the future.

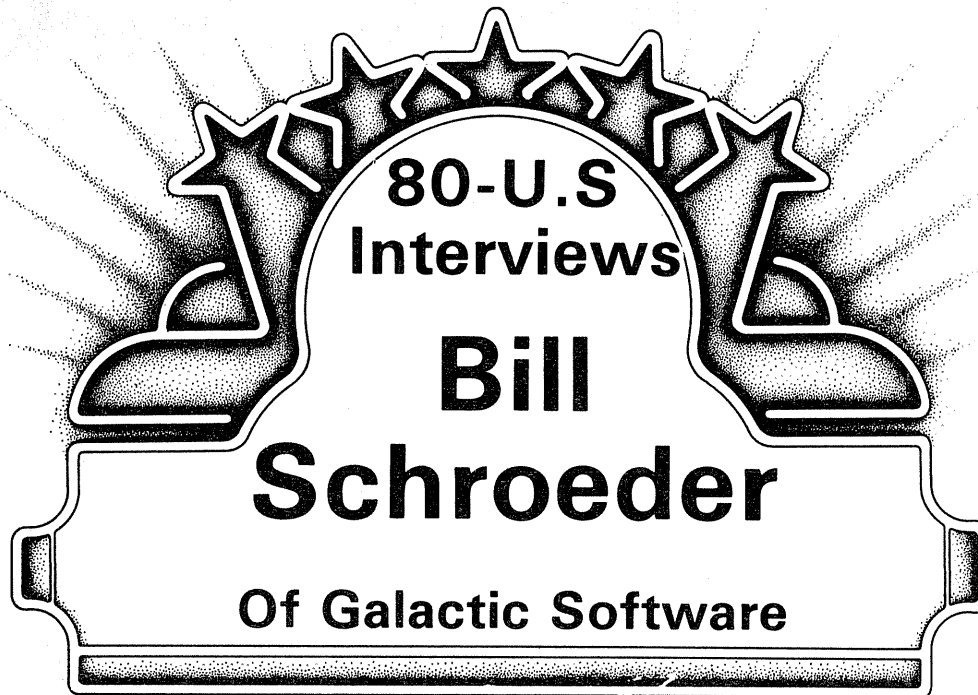
Stanley J Hesley  
4934 Siesta Drive  
Oceanside, CA 92054

*You might find it interesting that one of the new products we received from Acorn Software is made just the way you describe. A disk owner will get an expanded version while a tape user will get a stripped version of Everest Explorer. I think this will be something we will see more of in the future. -Ed*

Reference 80-U.S. May/June 81 page 20, Items at Random. Here is my input on what I'd like to see. I'd like to see "many" articles on the listing of programs using "Bar Code" format based on the "PaperByte" system; the optical reader/wand and the interfacing with the TRS-80, that is, hardware and software articles; and the possibility of listing some programs in 80-U.S. (in the near future) in PaperByte Barcode format.

J Trinque  
Clinton, MA

*Some interesting possibilities here. The PaperByte system was published in Byte Magazine some years ago, and I thought it might take hold. However, it never really got off the ground. -Ed*



80-U.S  
Interviews

**Bill  
Schroeder**

**Of Galactic Software**

Three and a half years ago Bill Schroeder was trading in the stock market and felt a computer could help in that activity. With the advent of low cost units like the Radio Shack TRS-80, he took the leap.

Other than reading a few books, he had never operated a computer before, and like most of us, was bitten by the bug when he acquired his first Model I Level I. It all started with his programming a TRS-80...

**80-U.S.** - How did Galactic Software come about?

**Bill** - After being in it a short time, I found a natural ability for it and initially wrote some programs for the Tandy Corporation under contract. We formed Galactic about two and a half years ago as a division of an existing corporation. That corporation had been in business eleven years, so it was very stable and financially able to start a new venture. Now we have some 3000 square feet of office space and this division has five full time employees, plus three associates across the country.

**80-U.S.** - What were the early programs you wrote for Tandy?

**Bill** - Versafile for the Model I and II, the Communications Packages for the Model I and III. We wrote Tandy's national parts ordering system which allows every service department in the country to order their parts from Fort Worth on a daily basis over the telephone. This data communications system was the first network Tandy ever implemented.

**80-U.S.** - In writing software, Galactic has become known for its commitment to excellent software and documentation. How has this been accomplished?

**Bill** - We try to write only what will, from a practical standpoint, fit on a machine and work comfortably for the user. We don't believe a general ledger can fit on a Model I for most small companies. It is too big a program and it requires too much storage space which is just not available. So therefore, we don't have a general ledger.

We try to pick products that will fit and function very well. We write them so that the novice type computer user can be very happy with what he has got. And that, with the documentation (which should contain no technical terms), is so that the secretary in the office can start using it right away.

**80-U.S.** - Will Galactic eventually go beyond software, perhaps into books or hardware?

**Bill** - If we go into hardware, it would only be some very special small peripheral. We have nothing in our immediate plans that would have us do this.

In regards to publishing, yes, we will very likely be publishing something in conjunction with Mysisis.

**80-U.S.** - Recently Lobo Drives introduced their LX80 interface for the Model I along with a new product, LDOS, for which you were project

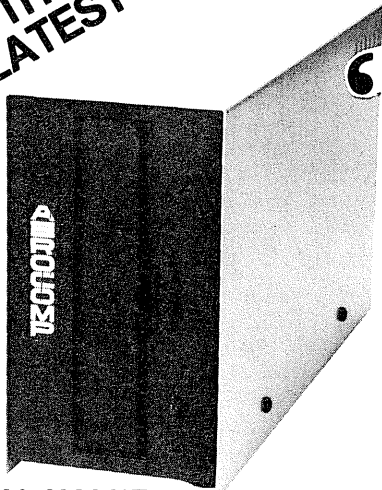
leader. Why another operating system?

**Bill** - When Lobo approached us we contacted one of our associates, Roy Soltoff, and we talked over the possibility of modifying TRSDOS, or modifying VTOS, or creating a brand-new operating system for Lobo's LX80 interface. None of the present operating systems as they are written function properly with the LX80. Something had to be done and Lobo wanted us to do it. We agreed to do it, and so LDOS came about. As it was being written to function on their piece of hardware, a natural evolution took place. It gave us the opportunity to place enhancements in it which we always wanted to see in a system. Roy did the lion's share of the actual writing of the operating system while we did the coordination and the production of the documentation.

**80-U.S.** - What about the rumors that LDOS is an upgraded version of VTOS 4.0?

**Bill** - In part, that is absolutely correct. Because of the time constraints, we could not write an original operating system from scratch. VTOS 4.0 was partially written to support the LX80 as it was. Randy Cook, the author of VTOS 4.0, was originally working for Lobo, but failed to complete the project. So the unlimited, non-exclusive rights to VTOS 4.0 were obtained and we started with that as a basis. We tore it completely apart, created pure source code out of it, and then began a massive modification project.

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- **DOUBLE DENSITY** Refers to recording density in bits per inch (bpi). Typically single density means data can be recorded up to 2,938 bpi; double density means data can be recorded up to 5,876 bpi.
- **DOUBLE SIDED** Refers to number of read/write heads. Single-sided is one head, read/write one side only; double-sided is dual heads allowing read/write operations on both sides of the diskette. A double sided drive appears as two separate drives to the controller. (Model 80-2 & 160-2)
- **ACCESS TIME** The time required for the head to move from one track to the next. Typically 5 to 40 milliseconds (ms).

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<b>RADIO SHACK*</b>	NO	40ms.	YES	NO	109K bytes	NO	NO
<b>PERCOM</b>	YES	25ms.	YES	NO	250K bytes (both sides)	YES	NO
<b>MPI</b>	NO	5ms.	YES	YES	125K bytes	YES	NO
<b>SHUGART</b>	NO	40ms.	YES	NO	109K bytes	NO	NO
<b>TANDON</b>	NO	5ms.	NO	NO	125K bytes	NO	NO

Factual material from current manufacturer's data sheets is believed reliable but cannot be guaranteed, comparing Aerocomp Model 40-1 to similar models.

The TRS-80\* expansion interface limits the track to track access time to 12ms.

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Internally, it is not as similar as people would think to VTOS 4.0. Externally, it is very similar. We kept it that way so that the users would not be confronted with a totally new syntax, a totally new way of putting in parameters, etc. We stayed upward compatible from both the media standpoint with TRSDOS and VTOS and upward compatible from the users standpoint when interacting with the DOS. There are many, many new parameters, new commands, new options, new functions in the system and a new support method. But all the ones that the people have learned to expect to be there in a TRSDOS-like operating system are still there.

**80-U.S.** - You say upward compatible with the media. Are you speaking of SCRIPSIT and some of the applications packages that have been released?

**Bill** - Yes, everything that has been released by Tandy, by Microsoft, and by most other vendors will run directly on the Model I using LDOS, whether it be on the LX80 or on the Radio Shack Interface.

**80-U.S.** - What is your relationship with Lobo and Tandy?

**Bill** - At present, Lobo is a client of Galactic Software and Mysosis. And Tandy is a client. We do things for them under contract, under purchase order and under royalty license.

**80-U.S.** - Is LDOS being expanded to work with other equipment?

**Bill** - Yes, by the time this is in print, LDOS will be available to the public on the Model III and by the end of the year we are hoping to introduce LDOS on the Model II and some selected S-100 systems.

**80-U.S.** - Could a user take his Model I SCRIPSIT or VISICALC and run it on the Model III under LDOS?

**Bill** - No, unfortunately because of some of the things Radio Shack has done in ROM and with the hardware itself this would be impossible. The SCRIPSIT from his Model I would not run in Model III. The Model III SCRIPSIT will run in the Model III under LDOS.

Where the media is compatible, a Model I diskette, containing a Basic program may be placed into a Model III and that disk and that program can be read, loaded and run with no problem.

Basic programs are transportable and files are directly useable. The only thing that is not useable would be machine language programs that use some undocumented calls, because those calls have moved. The documented calls that Radio Shack had in the Model I are, for the most part, the same. So, a vast majority of the Model I software will run directly on Model III LDOS without needing to be converted in any manner.

**80-U.S.** - You mentioned some selected S100 machines and the Model II. Is this going to be a TRSDOS-like operating system, such as LDOS is on the Model I?

**Bill** - It appears that it will not. We have the intention and we are working toward the goal that it will be CP/M compatible instead. It will also be TRSDOS compatible in regards to running Basic-type programs. But one has to face realities. There are a lot more CP/M programs out there than there are TRSDOS Model II programs. Therefore, we have elected to make it our best attempt to make this thing CP/M compatible, but also compatible from the standpoint of being able to read media with Basic programs and data files that are created under the Model II TRSDOS environment.

**80-U.S.** - The Model II currently has two DOS's, 1.2 and 2.0. Some of their software is intended to run only under 1.2. What about a situation like that?

**Bill** - That would be a machine level constraint again. And if it has a machine level constraint then we have a problem that it just would not run. If it were all in Basic it would run.

On the Model II we will be totally restructuring the operating system in its entirety. Existing operating systems, like 1.2 and 2.0 on the Model II, are totally incapable of handling hard drives in any responsive manner. So there will obviously have to be a new operating system coming from Tandy when they provide hard drives. Again, probably with no upward or crosscompatibility between media. We will not have that problem.

**80-U.S.** - What about the Basic used with this equipment?

**Bill** - The Basics will be compatible all the way through as the user should change machines or upgrade to a higher level of LDOS. We will always maintain that. And, you will be able to read a file entirely across if it is an LDOS operating system. It will be able

to read every other LDOS disk including hard disk. You plug your hard disk into your Cromemco one day and you want to plug your hard disk into your Model I the next and use that data file that was updated and worked on by the software in the Cromemco, it'll be perfectly readable and useable.

**80-U.S.** - What about 16-bit CPU's?

**Bill** - We are studying the technical information available on the Z-8000 at present and looking at different development systems, including the Zilog development system and others. Yes, we will be proceeding into the 16-bit market with an operating system.

**80-U.S.** - And other computers besides the S-100 based systems such as Apple and Pet?

**Bill** - It's unlikely that we will enter the Apple and Pet market.

**80-U.S.** - Even with Microsoft's introduction of the Z-80 card for the Apple?

**Bill** - That's not a 100% conversion, turning the Apple into a Z-80 machine. There are problems with the interrupt structure and hardware clock is not available. So there are some constraining factors that would make a high-level operating system still a little impractical even using that method.

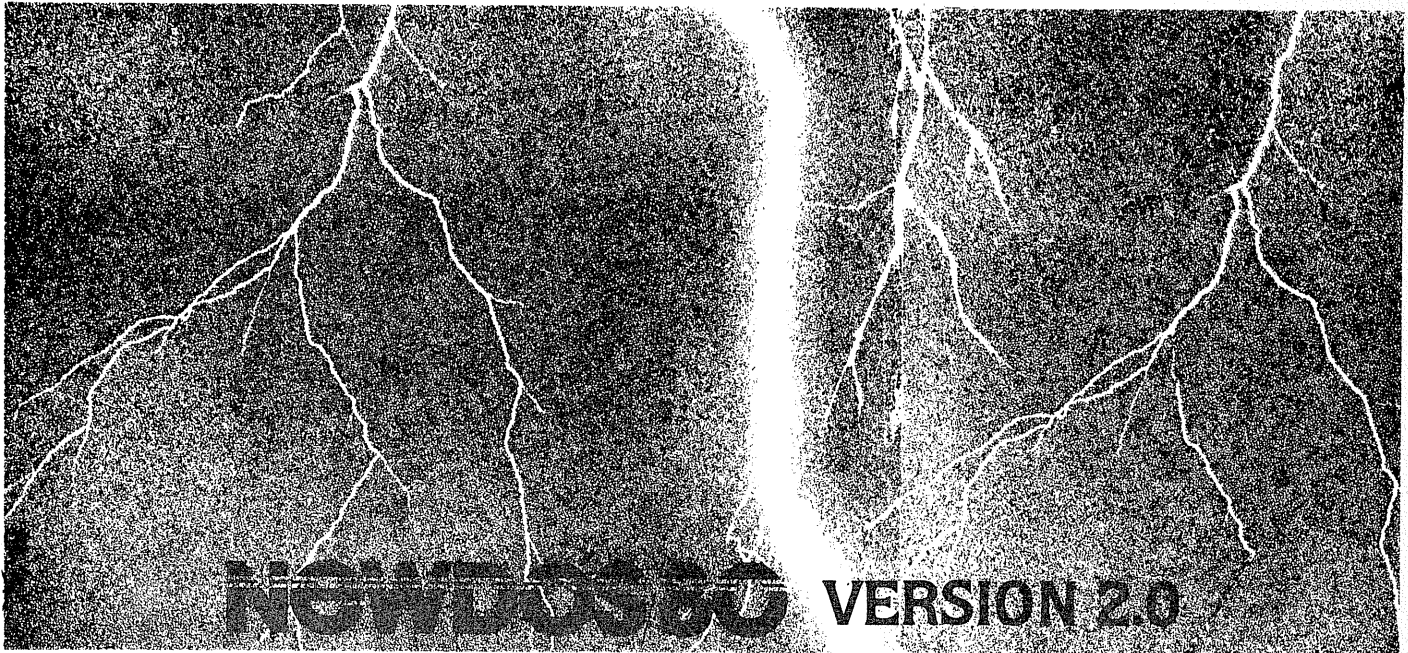
**80-U.S.** - Radio Shack is selling Ryan-McFarland's Compiler Basic for the Model II which is incompatible in many ways with the Basic Interpreter. We evaluated it, along with Microsoft's Basic Compiler a couple of issues ago, and stated that the compiler should be compatible with the interpreter.

**Bill** - That is probably the case if the interpreter is in ROM. In the case of the Model II, the interpreter is whatever is there. It's a totally RAM-based machine.

One has to look at those two languages from the standpoint of, "Are they even the same language?"

They both have their roots in Basic, but Microsoft's Basic came from an 8K tape based Basic and grew to an extended Basic, to a Disk Basic, and to an extended Disk Basic, and it is an excellent product. Ryan-McFarland's Basic came from a mainframe, went down to a mini, and now to a micro, and it is also an excellent product.

A person who knows how to program in Microsoft's 4.51 or 5.0 Basic, will not be comfortable or even



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To send input and output from one device (display, printer, keyboard, etc.) to others or to a routine in main memory.
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To set printer formatting on the MODEL III.
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Commands to set the specifications on the serial output port.
- **DISASSEMBLER OUTPUT TO DISK**  
The Disassembler will now write a source code file to disk, which the editor assembler can read and edit.
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able to do certain things in Ryan-McFarland's. But the converse is also true. Professional programmers who have worked on minis and mainframes utilizing a Ryan-McFarland type Basic will not be able to program in Microsoft's in a comfortable manner.

Ryan-McFarland's Basic is an extremely powerful business Basic, which forces a modicum of structured programming onto the user. Microsoft's Basic is flexible, but does not force any type of structure. It has dynamic allocation of additional RAM during string useage which Ryan-McFarland's does not. It also has the problem of losing precision with extended math functions in the large numbers businesses often have to deal with. Again, Ryan-McFarland's does not have this problem. It is designed as a business Basic, much more akin to the C-Type Basic than Microsoft's.

Microsoft's Basic has been on the market for several years, around five or so, and now it's being compiled. But remember, the first day that Ryan-McFarland's Basic was available many yars ago, it was a compiled Basic. So they were designed with completely different thoughts in mind.

**80-U.S.** - Other industries appear to be ages ahead of us in evaluations,

one of them being the audio industry with an independent testing lab such as the Hirsch-Houck Lab, which does reviews for several stereo and electronics magazines. The computer industry has never developed anything like this and very few evaluations go in-depth, such as power consumption, heat, radiation, and that type of thing. It is something that we probably won't see in the near future. What are your thoughts on evaluations?

**Bill** - I think that often the evaluations we see are by persons who are not well versed in the area they are evaluating. But these are the only people available, so it is not to be critical of what they are doing.

Let us say, hypothetically, you have someone who is going to review the Basic Languages that are currently available to the public. You find the situation where this person will probably have to know no less than eight or ten Basics that are available on micros. It is a little unlikely that a person will have all these different machines on which he can run all the different Basics and become familiar with them. It would take an awful long time.

Also, in our industry it is a little different than connecting up test equipment to an actual physical piece

of hardware. So much of this is subjective to the person doing the reviewing. Because it is subjective and all the reviews coming out are very much editorialized by the author, it is very important that editorial comment from the author be based on excellent experience and background with the product. He needs to compare competitive products to the one he is reviewing so that proper editorial comment may be drawn into his article and give proper information to the reader.

**80-U.S.** - What about the future for for Galactic?

**Bill** - There will be the 16-bit machine project; there will possibly be projects for machines outside the TRS-80 realm as other vendors request our services. There will definitely be hard disk support, both on the Model I/III and the Model II. That's all eminent. We have hard disks running here in our office and have for a considerable length of time, on all the TRS-80's, and we are very satisfied with what we have there. We will probably continue into the custom market as we have been, and into the systems software market, with assistance again, of Mysosis, because we found that what we are doing there is very well received. It is obviously a valuable market. ●

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# ITEMS AT RANDOM

## Corrections

Somehow we got carried away with the fact that the Mar/Apr 81 issue was almost letter perfect and didn't do the proof job on the May/Jun issue that we should have.

First we goofed in proofing the final version of the PEEK and POKE patch. In the Patch to Basic, the 6th line, last column should have read:

**C=D04F4B**

And the problem between the number zero and letter "oh" has been corrected in this issue with the OCR-B typewheel, which has a square number zero and an oval letter "oh".

Does anyone know of a Diablo-compatible wheel that has a slash number zero and an up arrow for the left bracket in 12-pitch? If you do, send us the details.

The Sketch and Pack listing on pages 49 and 50 (May/Jun 81 issue) was confusing to many readers because of the above problem. Down to line 720 in the program, all zero's are just that: zero. Line 720 is the variable (letter oh equals number zero). Same with line 740. Lines 760 and 790 are all the variables oh equals oh, etc. Line 810 is IF the variable oh is greater than 704 THEN variable oh equals zero. The PRINT@'s in lines 820, 830 and 850 are all PRINT@ variable oh. Lines 870 and 880 use the variable oh. The subscripted variable A in lines 910, 930 and 940 are numbers.

Our apologies to Leo on page 95 where one reader commented that our printer was trying to ween his press of ink (like I try to ween my car of gasoline). Somehow the plate was overexposed and not caught during the press run. Reference lines 21 and 22 are critical and hard to read in most copies. Line 21 reads:

**1010 L=PEEK(16424)+PEEK(16425)\*256-1**

Line 22 reads:

**1011 RESTORE:FORN=0TO13:  
READD:POKEL+N,D:NEXTN**

On page 99 reference line 26 should read:

**1011 RESTORE:FORN=0TO7:  
READD:POKEL+N,D:NEXTN**

Reference line (27) 255 FORM=.. should be (28) 256 FORM=.. Also on page 99, the second column of text listing should be reference numbered 34 to 40 instead of 24 to 30.

The last number in the data statement of line 6050 in Space Marauder's listing should be 71.

## YET ANOTHER IMPORTANT ANNOUNCEMENT! WE GIVE UP!!

Our recent announcement, made only to Foreign subscribers, has brought such a torment of emotion that we must reconsider. Although foreign subscriptions account for only about 1.3% of our circulation, their voice was so strong after the recent postal rate increase that we now must make the following changes in foreign subscription rates:

**Canada and Mexico remain at \$20. per year. They are sent via surface mail, and no two or three year subscriptions are offered. Essentially, this is no change from what it was previously. All other foreign subscriptions are now \$30. per year via surface mail and \$48. per year by airmail.** Those currently on a surface mail rate may upgrade it to airmail by remitting the difference for the remainder of their subscription.

To all those who wrote about this situation, we thank you for your support and interest. Frankly, we should have sampled your opinions prior to making such a move. Please accept our apology, and however you choose to receive 80-U.S., we hope you continue to enjoy it.

We have probably sent more second copies of the Mar/Apr and May/Jun 81 issue than ever before. It's easy to blame the post office for the condition the magazine arrives in, and they are responsible for a certain percentage of battered and torn copies. *But not that many!* The problem, and the responsibility, rest right here, with us. For example, if a magazine gets into the wrong bag, it may be handled by people along the way several times more than it normally would have. *That* accounts for the wear and tear too. In an effort to eliminate some of this problem, and at the same time reduce mailing costs, 80-U.S. is now being printed and mailed from South Dakota. *South Dakota?! Yes, that's right, since that is almost the geographical center of the North American Continent.* From there, there is no place in the U.S. past postal zone 6, which saves money and should save wear and tear on the copies you receive. At the same time, about three-fourths of the country should receive their issues slightly earlier than before. Let's hope it works to everyone's satisfaction.

You may notice that in this issue TR Dettmann is conspicuously absent. Terry, unfortunately, has had a rather bad time of late with an ill son. His Files & Foibles installment, scheduled for this issue, will appear in the next, and we all wish both TR and TJ the best and hope to see both back in action soon.

Authors who have or are contemplating writing programs for TRS-80 should consider sending them to 80-U.S. We have a deal with the Exatron Corp, whereby we are able to offer a brand spanking new Stringy Floppy as payment for your work. *Go for it!!*

You have probably noted that we now sport a Universal Product Code (UPC) (*those funny little stripes you find almost on any product these days*). It arrived just before press time, and our only hope is that it doesn't clutter up the finer parts of our young cover model's anatomy. *The price of growing up is sometimes hard to take!*

## Model II Users

Even with the problems associated with POKEing into video with the Model II, has anyone come up with a way to directly address the video RAM of the Model II? It lies outside the normal 64K boundaries of RAM.

We are still looking for the routine to disable and enable the BREAK key of the Model II under TRSDOS 2.0 and 2.0a.

## In this Issue

In this issue we take a break and have some fun with Sundance by Jon Waples. For the Color Computer buffs, we made it run on your machine too, and added some music ala George Lucas.

With school coming up, some districts will want to try out the Student Timetable Printer program from Mr Sinclair. Those of you with printers will want to test throughput of your printer (and don't forget to send us the results), while R C Bahn explains Strings for those who are new to programming and Panattoni takes another look at those funny characters you get when you do your own lower case modification.

So, get yourself a cool drink, go rest in the hammock with 80-U.S., and make yourself a fun summer. **Tom**

80-U.S. Journal Jul/Aug 1981



# Color Computer Conversions and other goodies!

## 80-U.S. Staff

In this article we will discuss program conversions from Level II Basic into Extended Color Basic using Jon Waples' Sundance, found later in this issue. We will take a quick look at some of the material now available for the Color Computer.

Old timers will tell you the conversion they made from Level I Basic to Level II was a headache. For one thing, the two Basics were from two different sources and they used a slightly different syntax. The same is not true of the differences between Color Basic and Extended Color Basic. Extended Basic is just that—*EXTENDED*. However, Extended Basic is decidedly different from Level II Basic.

### Missing and Modified Level II Keywords

Level II words that are missing or modified in Extended Basic are as follows: (Those which remain the same are given in Figure 1):

AUTO is not included. In Level II, this starts the automatic line numbering function and is sorely missed in Extended Basic.

The CLEAR command and statement now includes the capability of setting top of Basic memory as well as reserving string space.

DELETE, used to delete line numbers, has been replaced by DEL in Extended Basic.

The NEW function does not clear the screen in Extended Basic as it does in Level II. Otherwise, it is the same.

SYSTEM has been replaced by CLOADM (load a machine language tape), or DLOADM (load a machine language tape at a specified speed), and EXEC (which transfers control to a specified address).

DEFINT, DEFSNG, DEFDBL, CDBL, CINT, and CSNG. Color Basic and Extended Basic have arithmetic function precision to 9 places. There are no integers or double precision numbers as such, so these statements and functions are not needed.

There is no provision in Extended Basic for error trapping, hence ERROR, ON ERROR GOTO, RESUME, ERR and ERL are not included.

The FRE statement, used in Level II Basic to determine the amount of free string

space, is not in the color machine. However, MEM remains the same and does not return any reserved string space, free or otherwise.

The RANDOM statement has been dropped. Re-running a program does not reset the pseudo-random number generator. However, it will always return the same results on power-up.

The graphics and screen functions, SET, CLS, and POINT, have added a color parameter. RESET remains the same.

Port addressing and I/O (INP, OUT) instructions are not included in Extended Basic.

Level II had only one USR call. Extended Basic has ten, like Disk Basic, and has added the DEFUSR statement for addressing requirements.

The editing feature of Extended Basic is similar to Level II. However, three functions are no longer included. They are the cancel & restart (A), the save changes and exit (E), and the cancel and exit (Q) commands. The shorthand period (.) for current line number is not included.

Line printer functions are included in Color Basic and Extended Color Basic. LLIST is the same, but LPRINT has been replaced with PRINT #-2.

### New Features

AUDIO turns the output of the cassette to the television speaker for interactive tape instructions on or off. MOTOR controls the tape motion on the associated tape deck.

Further tape movement can be controlled by SKIPF which will advance the tape to the end of the specified file. Tape files, incidentally can support names up to eight letters in length.

Musical tones are supported with SOUND and PLAY. We used PLAY in Sundance to create a space movie theme.

Extended Basic includes OPEN, CLOSE and EOF statements for sequential data files.

CSAVEM allows the creation of machine language programs. However, you cannot duplicate program cartridges with this

method, as computer control is passed automatically to the ROM pack when the cartridge is inserted.

The color computer can support two joystick controllers. JOYSTK will return values for either the left or right stick.

There are a number of graphics statements in Extended Basic and the order of execution is critical to proper program operation. The statements are CIRCLE, COLOR, DRAW, GET, LINE, PAINT, PCLEAR, PCLS, PCOPY, PMODE, PRESET, PSET, PUT, and SCREEN. One function PPOINT, returns the color value of the specified graphics cell.

The HEX\$ function doesn't cast any spells, but it does return a hexadecimal value. Extended Basic has a TIMER function which can be set and then polled for timing purposes. We did not use this function in Sundance, but could have.

Extended Basic supports three statements found in Disk Basic, but not Level II. INSTR returns the position of one string in another. The LINE INPUT statement allows any ASCII character (except the ENTER key) that is on the keyboard to be input into a string variable. The last feature in Extended Basic found in Disk Basic is the RENUM, or renumber feature. TRSDOS Disk Basic uses the keyword NAME for this feature. It quickly renumbers all program lines and their references in the resident program.

### Programming Color Graphics

This issue's cover shows the Color Computer using the program "Random Graphics" (it is Sample program 11 in the Extended Color Basic book). This program is a good short example of the sequence required for Extended Basic.

Three commands must be used in sequence. They are as follows:

(1) PCLEAR will reserve up to eight 1.5K pages of memory for graphics. If not used, four pages (6K) will be reserved.

(2) PMODE sets up the resolution to be used and the starting page of screen memory. In our case we selected the four color 128 X 192 mode and started with the

first page (PMODE 3,1). The Extended Basic book explains this in Chapter 3.

(3) SCREEN instructs the computer as to screen type (graphics or text) and color set (1 of 2 - either Black/Green and Green/Yellow/Blue/Red, or Black/Buf and Buff/Cyan/Magenta/Orange) depending upon the color mode.

Two additional commands are needed, but may be used anywhere and in any sequence following the PCLEAR statement:

(1) PCLS will clear the current screen to a specified color.

(2) COLOR sets up the foreground and background colors used by the other graphics commands.

High resolution graphics lines, boxes, arcs and circles used in Sundance may be created with the LINE and CIRCLE statements.

PUT, GET and PCOPY are statements which are used with the memory pages previously reserved. They will not be explored in this article.

**The Program SUNDANCE**

The following references are to the 16K Model I and Color Computer listings for Sundance, found later in this issue. N/A means that the routine was added to enhance the program. By referring to the appropriate manuals, a programmer should be able to get a good feel for program conversions.

**Some Sources of Color Computer Programs**

The following is a list of products which are presently on the market and have been received for evaluation:

**Allen Gelder Software** Box 11721, San Francisco, CA 94101, COCOBUG, Debugging Monitor for TRS-80 Color Computers (Software)

**Datasoft, Inc** 16606 Schoenborn Street, Sepulveda, CA 92343, Machine Language Monitor, Mini-Assembler, Dissassembler and Debugger (Software), Screen Edit Control System (Software)

**Osborne/McGraw-Hill**, 630 Bancroft Way, Berkeley, CA 94710, 6809 Assembly Language Programming (Book).

**Computerware**, Box 668, 1512 Encinitas Blvd., Encinitas, CA 92024, Power Pack (hardware), Color Diagnostics (Software), Color Editor (Software), Basic Lo-Res Games #1 (Software), Basic Lo-Res Games #2 (Software), Basic Lo-Res Games #3 (Software), Color Invaders (Software).

**Radio Shack** Pinball (Program cartridge), Quasar Commander (Program cartridge), Dinowars (Program Cartridge), Music (Program Cartridge), Skiing (Program Cartridge).

Though we haven't received any for evaluation, educators need to be aware of the large number of educational program (tutorial in nature, for primary grades) for the TRS-80 Color Computer, from Dorsett Educational Systems, Inc., PO Box 1226, Norman, OK, 73070.

As can be seen, conversion can be accomplished, but it takes time and possibly, as was the case here, reworking the program logic. A programmer must analyze the existing program to the nth

degree and completely understand it before attempting conversion. It would be a good idea to draw a moderately detailed flow chart as an aid to conversion. Even then, conversion will not always be straightforward.

Line Numbers for Color	Mod I	Description
10-50	10-40	Remarks
60-130	Part of a routine at lines 560-580	
140-150	50	Clear memory
160-200	750-780	Sound routine
210	N/A	Set up color graphics
230-250	N/A	Draw unfolding sun
260-310	630-740	Assign variable values
320-330	N/A	The words "Score" & "Time"
340-360	N/A	Draw the word "Sundance"
370	N/A	Play opening theme (160-200)
380-480	790-1040	Introduction and instructions
490-510	1050-1080	Get number of suns
520	1080	Gogo subroutines which
600-1170	1990-2010	draws the grid and
860-900	2020-2070	selects sun locations.
530	1100	Draw Score and Time
540-550	N/A	Draw a red planet with ring
560-580	1110-1370	Main loop and movement - color program uses subroutine at lines 60-130 as well.
590,780-840	1490-2010	Redraw any disturbed grid
600-620	1380-1470	Test for pressed key and goto
910-930	see below	open grid
940	see below	No sun, close grid
950-980	see below	catch sun, play note, reset sun
990	see below	and close grid
1000	see below	add to score
1020	see below	and select replacement sun
910-990	1610-1970	routines for catching sun
1040-1170	1100	draw score and time remaining
1180-1290	2080-2270	end game routine

Figure 1

Basic Keywords that are the same for both Level II and Extended Color Basic

Commands	Statements	Functions	Operators
CLOAD	DIM	SIN	+
CLOAD?	END	SQR	-
CONT	STOP	TAN	*
CSAVE	GOTO	MEM	/
EDIT	GOSUB	PEEK	^
LIST	ON...GOTO	POKE	=
RUN	ON...GOSUB	POS	>
TROFF	FOR/NEXT/STEP		<
TRON	REM	Strings	>=
	IF/THEN/ELSE	ASC	<=
Input/Output		CHR\$	<>
PRINT	Functions	INKEY\$	AND
PRINT@	ABS	LEN	OR
TAB	ATN	LEFT\$	NOT
USING	COS	MID\$	
INPUT	EXP	RIGHT\$	
DATA	FIX	STR\$	
READ	INT	STRING\$	
RESTORE	LOG	VAL	
PRINT #-1	RND		
INPUT #-1	SGN		

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By the Cornsoft Group. New for the PMC-80. This program is a machine language imitation of the arcade game called Missile Command. This real-time machine language game (with sound effects) pits your twin silos of ABM's against a barrage of enemy missiles trying to destroy your cities. As your skill increases so does the difficulty of this ever popular arcade game! Watch the skies and may your aim be true. TRS or PMC-80, cassette, 16K ..... \$14.95  
TRS, disk, 32K ..... \$20.95

**TAPE COPY 1**

©1981 S.S.M., Inc. New for the PMC-80. This program solves the problems that have plagued all PMC-80 owners. **Problem:** A machine language program will not load in the cassette player provided in the machine and you can't load a machine language program on the second cassette port. **This is a problem no more!** This program will load a machine language program from the second cassette player and saves it to the built-in cassette player. Loads and saves most TRS-80 readable tapes that load at 500 baud (the standard speed). MOD I or PMC-80. Cassette ..... only \$14.95

**CONQUEST**

©1981 by Lake Front Software. This program is based on the popular board game called "Risk" (The names have been changed to protect the innocent.) This game is for one or more people. It is a game that demands attack strategy and, if yours is the best, you will be the 'Lord and Master' of the planet. MOD I, III or PMC-80. Requires 16 K memory, cassette ..... \$14.95

**FLIPPY - Ver. 1.3**

©1981 by J. Limkemann. This is a machine language program that plays "the best game of Othello on the TRS-80 that I have seen, and I play a lot of Othello" (Victor Andrews) MOD I or III. Requires 16K memory. Cassette ..... \$14.95

**COLOR**

**ANIMATED HANGMAN**

Color. ©1981 S.S.M., Inc. This outstanding new program will thrill you for hours. He moves, groans and makes sounds. 16K. .... \$12.95

**DISASSEMBLER**

Color. ©1981 S.S.M., Inc. This program displays hex on left side of screen and ASCII on right side of screen. For screen or printer. 16K. .... \$14.95

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**MODEL III/  
BOOK**

**MOD III ROM COMMENTED**

For the programmer that needs those answers about the MOD III ROM ... Now! This is a complete list of locations in MOD III ROM and comments on each. All 14K of the ROM. There is no other book that gives you the detail this book has. Don't miss it. In order to respect Tandy's copyright the actual disassembled code is not printed, but the book is in a 3 ring binder format so you can put your own listing in between the pages for easy reading. .... only \$22.50

**MODEL III**

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©1980 S.S.M., Inc. The closest TRS version of "Space Invaders" arcade game. MOD I with mono sound, Cassette ..... \$19.95  
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**BUG +**

Written by J. Limkemann. ©1981 S.S.M., Inc. Bug + is a powerful machine language monitor. The one point most improved over other monitors, is the tape write. Bug + has the ability to write a "clean" tape (at 500 baud) this tape will read into the TRS-80 under the system command, without the problems previously associated with the volume setting. Regardless what version basic you have or whether or not you have a Radio Shack cassette fix, this monitor will improve the reliability of your cassette by 100%. There is also a verify command that works the same as also a verify command.

Finally a break point that works! When a break point is reached, there is a blinking astrick in the bottom right hand corner, you are able to see what is on the screen before the monitor takes control. Press the enter key the screen clears and the monitor comes to life. When you continue from a break point, the monitor will restore the screen first then load the CPU registers and return to your program. You do not lose your program or display, and it does work!

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By Alger Software. ©1980 S.S.M., Inc. A machine language mailing list program that will do the following:

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- Print one label at a time or a sequence of labels
- Purge duplicates with or without user assistance
- 9 digit zip code

- Super fast search on any field - 3 second average
- Easy screen editing

Now Postman Data Handler has been upgraded with many new features. Now this very popular mailing package is not just the best way for most people and small businesses to do their mailing lists, but now we give you a way to uncramp, convert and formletter your mailing list. You need this package if one of the following is true: If your mailing package is memory dependent. This means that you must have more memory to handle more names in your machine; If you need a way to get rid of duplicate names in your mailing list; If you want to sort on more than just name or zip. (our package can sort on any or all 10 fields at once.); If you are waiting more than one minute for your sort to finish. (our package is in machine language so it runs very fast); If your present program will not handle

the 9 digit zip code; If your program doesn't have full screen editing. This package is a machine language program, this is the reason for the super fast speed of all functions!

This is a random access disk based program and any name can be called to read, write, print or update in 3 seconds or less. Now along with it you get utilities that permit you to do the following: CONVERT 1; takes all the files from your old mailing list and converts them to our system. (Why should you change to our system if we made the change hard?) CONVERT 2; convert from our package back to ASCII files if you want to do something with them (like send them to another computer over the phone). MOD I (coming soon for the MOD III). This program runs on all quality operating systems. Requires 1 disk drive ad 32K memory.

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**GRAPHX**

By Steve Skindell. ©1981. This is a program that is for the person who does reports or requires some sort of plotted output to show gains or losses, or any type of output that needs graphs. This program puts to the screen or to a printer the plotted points in bar graph format and plots the mean, and averages of input. This is a very important program for accountants, CPA's and the average businessman to evaluate, at a moments glance where he is, was, or where he is going. Files saved to disk can be recalled at any time to be reexamined, modified, or just reprinted. An extra feature: if you have the Microline 80 printer, by Okidata or Epson MX-80, your output is in true graphics. Information is supplied for the user so he can modify this program for other printers. Comes complete and ready to run. Requires MOD I or MOD III, 48K disk. Printer optional (132 col.) ....  
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**SPECIAL** - Receive this program for only **\$25.00** if you purchase an Okidata Microline 80 or 82 this month from us. Call for our low, low price.

**MINI POSTMAN**

Sample Package. For you people who have a small mailing list (max. 26 names) and/or you can't believe that Postman is the best package and we must be overstating how well this program runs; try our sample package called Mini Postman. It comes as an up and running program and shows you how good our package really is. This package can be upgraded to the full package within 30 days of purchase by calling and saying "I want the full package", and paying the difference between the mini and the full package. Note: Mini Postman does not include the convert utilities. If not everything you expect, return sample disk for full refund (less shipping). You can't lose.  
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**Standard Printer Module.** This printer module is provided for the user as a standard feature. Optional special printer routines for custom printer will be available in the near future. In this original release, it has the following printer drivers and will support the following printing devices: RS232, TRS232 and PARALLEL printer ports. You have the following format commands: Justifies Text, Centers Text, Centers Title, Line Spacing, Line Length from 3-255 characters and Set Margins / Also send any ASCII code to any printer from the text / Save formatted text to the disk for spooling later / Information for customer to load his own special printer driver / Printing can be stopped and started by the user at any time and then restarted where you left off / You can print entire file or just print to bottom of the page /

**Communication Package.** RS232 COMMUNICATION TERMINAL PROGRAM permits you to communicate with other computers. Transfer files from one machine to another. Permits dumping memory across the phone lines. Receive files from other TRS-80's and "Shake Hands" with larger computers. This is the complete system called LAZY WRITER. There is no package written for the TRS-80\* that is as comprehensive. This package is available for the TRS-80\* MOD I, 32K or larger with at least a single disk drive. List price is from

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**Mandatory space command.** This is necessary when you are writing letters or papers that have certain words that are not to be broken-up. eg.: John P. Andhouser. This name can be made to be unbreakable to justify routines in the program.

**Disk catalog.** Now you can load your disk directory into memory and create a file of this information.

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**SUPER UTILITY**

©1980 by Kim Watt of Breeze Computing, Inc. Sold on protected media only.

**Main Program list:**

**Zap Utility;** display sector (disk, file), display memory, compare disk sectors, copy disk sectors, verify disk sectors, zero disk sectors, string search, sector search, single or double density diskettes (if your machine works normally with double density).

**Purge Utility;** kill selected files, get disk directory, zero unused directory entries, zero unused granules, remove system files, kill by category, change name, date, password, auto command, change file parameters, remove passwords.

**Disk Format Utility;** standard format, format without erase, special format, read address marks.

**Disk Copy Utility;** standard copy with format, standard copy without format, special copy (to back up many protected disks) - purchaser use - only for his own personal disks.

**Tape Copy Utility;** this program is to make backup of many TRS-80 tapes, no matter how it is recorded (note again this program is for the use of the original purchaser for his own programs only).

**Disk Repair Utility;** repair gat table, repair hit table, repair boot, read protect directory track, recover killed files, check directory.

**Memory Utility;** move memory, exchange memory, compare memory, zero memory, test memory, input byte from port, output byte to port, memory to disk, disk to memory.

MOD I, protected disk only ..... \$49.95  
Back up copy available!

**QUICK FIX**

©1981 by Kim Watt of Breeze Computing, Inc. The sister program to Super Utility "the Grand Master" of utility programs, and has the ability to do all the things that have made Super Utility great, except: it does not have the following features; it doesn't have the Special Copy that backs up most TRS-80 readable protected diskettes, it does not have Tape Copy feature that copies many TRS-80 MOD I readable tapes, the Zap program does not go to double density diskettes, it does not have the Special Format feature.

**Main Program List:**

**Quick Zap;** display sector (disk, file), display memory, compare disk sectors, copy disk sectors, verify disk sectors, zero disk sectors, string search, sector search, examine address marks.

**Quick Purge;** kill selected files, get disk director, zero unused directory entries, zero unused granules, remove unused system files, kill by category, change name, date, password, auto command, change file parameters, remove passwords.

**Quick Format;** standard format, format without erase.

**Quick Backup;** standard copy with format, standard copy without format.

**Quick Repair;** repair gat table, repair hit table, repair boot, read protect directory track, recover killed files, check directory.

**Quick Memstuff;** move memory, exchange memory, compare memory, zero memory, zero memory, test memory, input byte from port, output byte to port, memory to disk, disk to memory.

The one extra feature it has is: you can put Quick Fix on all your diskettes. MOD I. On nonprotected diskete ..... only \$34.95

**OTHER THINGS from Kim Watt of Breeze Computing, Inc.:**

**MAKE 80**

©1980 AM Electronics. Written by Kim Watt. This program is for people who have 80 track disk drives and do not wish to keep that old 40 track drive just to load their 80 track system. Make 80 is loaded into your machine when it is placed in your 0 80 track drive, and the reset button is pressed. It loads automatically and asks for 35 or 40 track diskette. When you insert your diskette in the drive the program reformats the diskette so your 80 track disk system can read all of the information from the diskette without having to have a 40 track drive. This program works on standard NEWDOS, TRSDOS, NEWDOS-80 diskettes. Does not work on any disk that has any funny sectors (VTOS) or with the LOBO interface. 80 track disk only. \$14.95

**SPACE COLONY**

by Kim Watt. Space Colony is a space invaders type game for TRS 80 MOD I and with Programma Graphix 80 board. One level of play single player, with sound. MOD I, 16K Cassette ..... \$14.95

**CAPTURE/SYMON**

By Breeze Computing, Inc. Capture is a 2 person game of Blockade for the MOD I. With sound this game comes alive with fast action. MOD I, 16K. Cassette .... \$12.95  
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\*TRS-80 is a product of Radio Shack, division of the Tandy Corporation.

# Soft Sectoring

## or

### What To Do When

# Super Zap **CHOKES**

**This program requires NEWDOS, TRS-80 Model I, a 16K Expansion Interface (Radio Shack Only), and one disk drive. The program will work on data disks as well as system disks in a one drive system.**

**Dan North  
Kansas City, MO**

You never got around to making a backup of the program which you spent six weeks writing and now it won't work. It's a little late to think about the line filter you were going to get or the fingerprints you got on the diskette. Or maybe you put your disk too close to a magnetic field (like the top of your video monitor). So, load up SUPERZAP, one of the utilities supplied with Apparat's NEWDOS series of operating systems, and try to salvage it. To find the sector in which the error is located, execute a "VERIFY DISK SECTORS" command. Eventually, the track and sector number(s) of the offending segment(s) is displayed.

Attempting to display the sector or sectors will give an error message. After pressing ENTER, you may or may not see a typical display. If you try to modify that sector and if it doesn't work you have encountered one of a small group of disk errors which cannot be corrected by using SUPERZAP alone (unless you didn't remove the write protect tab). These errors are characterized by the message: "DRIVE X, TRACK YY, SECTOR ZZ TO BE WRITTEN IS UNREADABLE. SHALL IT BE READ PROTECTED", when SUPERZAP attempts to make a

change in that sector. The problem is not just with the data stored but with the way in which the computer locates that data area on the diskette.

There are two physical ways to sector a disk. One is hard sectoring and the other soft sectoring.

Hard sectoring disks have a series of holes on the inner portion of the diskette, each marking the start of a sector. Timing is established by these sector holes passing by a timing hole in the diskette jacket.

Radio Shack, along with several other manufacturers, use soft sectoring. Soft sectoring diskettes have one hole which passes a timing hole in the jacket each revolution. It marks the starting point of the tracks. To separate and identify each of the ten 256-byte data groups on each track there are 46 bytes of information. Those 46 bytes, located between each block of data, contain two spacing gaps, each consisting of 12 FF's followed by six 00's, and an ID Record.

The ID Record is located between the two spacing gaps and contains the track and sector numbers of the data which follows. Reading a track from start to finish would result in the string of bytes shown in Figure 1.

In general, reading and writing from the disk depends upon all of this information being present and correct. If it is not, read/write operations will terminate with an error message and corrections cannot be made using utilities like SUPERZAP.

The only time sector information is written (or repaired) in normal operation is when the disk is formatted. Of course, formatting the disk destroys all the data on it, which is not very helpful. What is needed is a program that will rewrite the sector information without affecting the data contents of the readable sectors.

The program here makes four attempts to read each of the ten sectors of a track. If it can't read a sector it will display an error character "R" on the monitor before continuing on with the next sector. Then the data contents of each sector will be saved in memory. With all the salvageable data safely stored, the track will be reformatted. Finally, the sectors will be reloaded with the data which was stored in memory.

Although it is unlikely that running the program will be enough to fix a disk, it will make any remaining errors accessible to the SUPERZAP utility. While making repairs with SUPERZAP is not always easy, this program allows you to use the utility to its fullest advantage.

Because the program will, hopefully, not be needed very often, it has been made short rather than elegant. The program can be assembled using either Editor/Assembler or DEBUG. It has been named FIXSEC.

FIXSEC needs the number of the faulty track, which can be found using the "VERIFY DISK SECTORS" command of SUPERZAP. It is a good idea to write down the numbers of both the track and sector numbers for future reference. Once you are able to read and write to those sectors you will know where possible errors are most likely to be found.

To run the program, go to DOS READY, load FIXSEC and then enter DEBUG. Once in DEBUG, memory 7D02 must be modified from 28 to the faulty track number which SUPERZAP has provided in hex (no conversion is necessary). While still in DEBUG and before executing the program, put the disk needing repair in drive 0. Entering G7D00 will begin execution of the program.

If you are actually using the program on a bad track an "R" should appear in the lower right corner of the screen. This indicates that an error condition was encountered while reading one of the sectors. A "W" would indicate a bad write and should never occur unless the diskette is physically damaged; in which case this program will do no good. The program terminates by returning to DOS READY. Reloading SUPERZAP at this point will show that the previously *unreadable* sectors can now be read and modified easily.

FIXSEC is unlikely to damage data information if run on a good track. However, it will not stop when it detects an error condition. If any sector of a good track cannot be read within 4 tries it may introduce errors. If this

happens an "R" will appear in the lower left hand corner of the monitor. Finding the sector in which the error occurred may be difficult. I have never had it happen and don't think it is likely. However, considering Murphy's Law and since it could cause significant problems, it should be mentioned.

Assembly programs which handle disk operations are a little more difficult than those only involving the Z-80 because the floppy disk controller chip must be given commands also. To make any sense of how this program works it is necessary to find an explanation of the disk controller chip. Two sources are TRS-80 Model I Disk Interfacing Guide, Bill Barden Jr (*available from 80-Northwest Publishing Inc, 3838 S Warner St., Tacoma Wa 98409, \$5.95*) and The Radio Shack Expansion Interface Service Manual, National Parts, Radio Shack, Fort Worth, TX 76101.

Armed with an understanding of the controller chip and the interface, you should be able to breeze through the program logic fairly easily. The only things that may seem out of place are the series of "EX HL". To understand them you have to examine the fine print in the controller description very carefully. After a command is issued to the controller chip the status of the controller cannot be reliably checked for 24 microseconds. Execution of "EX (SP),HL" four times provides that delay.

Hopefully, you will never need this program, but when the type of error that has been described does occur, it is the only solution that we know of. Whether you use the program or not, it contains all the necessary components for reading and writing to disk. I hope this sheds some light on how the disk works and why it sometimes does not.

Number of Bytes	Hex value on disk
2	FF
*12	FF First Gap
6	00
1	**FE ID Address Mark
1	XX Track Number
1	00
1	XX Sector Number
1	01 Sector Length
2	?? Error checking bytes generated by the disk controller
12	FF Second Gap
6	00
1	FB Data Address Mark ***
256	?? This is the Data
2	
2	?? Error checking bytes generated by the disk controller
approx 80	FF to fill out the disk

\* The bracketed field is written 10 times once for each sector.

\*\* These seven bytes are the ID Record.

\*\*\* On track 11 which contains the Directory, the Data Address Marks are FA.

Figure 1



```

00050
00060
00070
00080
7D00 00090 ORG 32000
7FFF 00100 TRACK EQU 7FFFH
7000 00110 BSTART EQU 07000H
7D00 F3 00120 DI
7D01 3E28 00130 LD A,28H ;CHANGE BEFORE USING
7D03 32FF7F 00140 LD (TRACK),A
7D06 31FD7F 00150 LD SP,7FFDH
7D09 3E01 00160 LD A,01H
7D0B 32E137 00170 LD (37E1H),A ;FLOPPY ON
7D0E 21EC37 00180 LD HL,37ECH ;CMD/STATUS REG.
7D11 11EF37 00190 LD DE,37EFH ;DATA REG.
7D14 3603 00200 LD (HL),03H ;SEEK TRACK 00
7D16 010000 00210 LD BC,00H
7D19 CD6000 00220 CALL 060H ;1 SEC. DELAY
7D1C CD977E 00230 CALL BUSY ;LOOP WHILE BUSY
7D1F 3AFF7F 00240 LD A,(TRACK)
7D22 12 00250 LD (DE),A ;PUT TRACK TO DATA REG.
7D23 3613 00260 LD (HL),13H ;SEEK TRACK
7D25 CD977E 00270 CALL BUSY ;LOOP TILL DONE
7D28 3E01 00280 LD A,01H
7D2A 32E137 00290 LD (37E1H),A ;CONTINUE DRIVE
00300
00310 ;LOAD ALL SECTORS
00320 ;TO BUFFER AREA
00330
7D2D 0600 00340 LD B,0 ;SECTOR COUNTER
7D2F 1604 00350 LD D,4 ;ERROR COUNTER
7D31 78 00360 LPB0 LD A,B
7D32 32EE37 00370 LD (37EEH),A ;LOAD SECTOR REG.
7D35 48 00380 LD C,B
7D36 0C 00390 INC C ;CALC BUFFER START LOC.
7D37 210070 00400 LD HL,BSTART
7D3A 0D 00410 LPB1 DEC C
7D3B 2808 00420 JR Z,FIN
7D3D D5 00430 PUSH DE
7D3E 110001 00440 LD DE,256
7D41 19 00450 ADD HL,DE
7D42 D1 00460 POP DE
7D43 18F5 00470 JR LPB1
7D45 3E01 00480 FIN LD A,01H ;HL HAS BUFFER ADDRESS
7D47 32E137 00490 LD (37E1H),A ;CONTINUE DRIVE
7D4A 3E88 00500 LD A,88H
7D4C 32EC37 00510 LD (37ECH),A ;READ A SECTOR
7D4F E3 00520 EX (SP),HL
7D50 E3 00530 EX (SP),HL
7D51 E3 00540 EX (SP),HL
7D52 E3 00550 EX (SP),HL
7D53 3AEC37 00560 LPB2 LD A,(37ECH) ;GET STATUS
7D56 CB47 00570 BIT 0,A
7D58 280B 00580 JR Z,DONEB ;NO LONGER BUSY
7D5A CB4F 00590 BIT 1,A

```

```

7D5C 28F5      00600      JR      Z,LPB2      ;DATA READY?
7D5E 3AEF37   00610      LD      A,(37EFH)   ;READ A BYTE
7D61 77        00620      LD      (HL),A
7D62 23        00630      INC     HL
7D63 18EE     00640      JR      LPB2
7D65 C5        00650  DONEB  PUSH   BC      ;WE NEED AN EXTRA REG.
7D66 3AFF7F   00660      LD      A,(TRACK)  ;ERROR CODE IS DIFFERENT
7D69 FE11     00670      CP      11H        ;ON TRACK 11 HEX
7D6B 0620     00680      LD      B,20H      ;ASSUME TRACK 11
7D6D 2802     00690      JR      Z,TR11B    ;IF IT WASN'T TR11 THEN
7D6F 0600     00700      LD      B,00H      ;ERROR CODE=00
7D71 3AEC37   00710  TR11B  LD      A,(37ECH)  ;GET STATUS
7D74 B8        00720      CP      B          ;WAS THERE AN ERROR
7D75 C1        00730      POP    BC
7D76 2808     00740      JR      Z,GOOD
7D78 15        00750      DEC    D
7D79 20B6     00760      JR      NZ,LPB0
7D7B 3E52     00770      LD      A,52H      ;ALL TRIES BAD
7D7D 32FF3F   00780      LD      (3FFFH),A  ;LOAD "R" TO SCREEN
7D80 1604     00790  GOOD   LD      D,4
7D82 04        00800      INC    B
7D83 78        00810      LD      A,B
7D84 FEOA     00820      CP      10
7D86 C2317D   00830      JP      NZ,LPB0    ;READ ALL 10 SECTORS
                    00840
                    00850      ;
                    00860      ;REFORMAT TRACK
                    00870      ;
7D89 3E01     00870      LD      A,01H
7D8B 32E137   00880      LD      (37E1H),A  ;CONTINUE DRIVE
7D8E 11EC37   00890      LD      DE,37ECH   ;CMD/STATUS
7D91 21EF37   00900      LD      HL,37EFH   ;DATA REG.
7D94 3EF4     00910      LD      A,0F4H     ;WRITE TRACK
7D96 12        00920      LD      (DE),A
7D97 E3        00930      EX     (SP),HL
7D98 E3        00940      EX     (SP),HL
7D99 E3        00950      EX     (SP),HL
7D9A E3        00960      EX     (SP),HL
7D9B 1600     00970      LD      D,00H     ;SECTORS 0-4
7D9D 1E05     00980      LD      E,05H     ;SECTORS 5-9
7D9F 0E02     00990      LD      C,2       ;INITIALIZE ROUTINE
7DA1 CD8F7E   01000  LP0    CALL   DRQ
7DA4 36FF     01010      LD      (HL),OFFH
7DA6 0D        01020      DEC    C
7DA7 20F8     01030      JR      NZ,LP0
7DA9 060A     01040      LD      B,10
7DAB 0E0C     01050  LP1    LD      C,12      ;LOOP FOR 10 SECTORS
7DAD CD8F7E   01060  LP3    CALL   DRQ      ;12 FF'S
7DB0 36FF     01070      LD      (HL),OFFH
7DB2 0D        01080      DEC    C
7DB3 20F8     01090      JR      NZ,LP3
7DB5 0E06     01100      LD      C,6       ;6 00'S
7DB7 CD8F7E   01110  LP2    CALL   DRQ
7DBA 3600     01120      LD      (HL),00H
7DBC 0D        01130      DEC    C
7DBD 20F8     01140      JR      NZ,LP2

```

```

7DBF CD8F7E 01150 CALL DRQ
7DC2 36FE 01160 LD (HL),OFEH ;FORM ID (ID AM)
7DC4 CD8F7E 01170 CALL DRQ
7DC7 3AFF7F 01180 LD A,(TRACK)
7DCA 77 01190 LD (HL),A
7DCB CD8F7E 01200 CALL DRQ
7DCE 3600 01210 LD (HL),OOH ;ALWAYS OO
01220 ;
01230 ;SECTORS ALTERNATE.
01240 ;USE D IF B IS EVEN.
01250 ;USE E IF B IS ODD.
01260 ;
7DD0 CB40 01270 BIT 0,B
7DD2 2007 01280 JR NZ,ODD
7DD4 CD8F7E 01290 EVEN CALL DRQ
7DD7 72 01300 LD (HL),D
7DD8 14 01310 INC D
7DD9 1805 01320 JR OUT
7ddb CD8F7E 01330 ODD CALL DRQ
7DDE 73 01340 LD (HL),E
7DDF 1C 01350 INC E
7DE0 CD8F7E 01360 OUT CALL DRQ
7DE3 3601 01370 LD (HL),01H ;SECTOR LENGTH
7DE5 CD8F7E 01380 CALL DRQ
7DE8 36F7 01390 LD (HL),OF7H ;GENERATE CRC
7DEA OEOC 01400 LD C,12 ;12 FF'S
7DEC CD8F7E 01410 LP4 CALL DRQ
7DEF 36FF 01420 LD (HL),OFFH
7DF1 0D 01430 DEC C
7DF2 20F8 01440 JR NZ,LP4
7DF4 OEO6 01450 LD C,6
7DF6 CD8F7E 01460 LP5 CALL DRQ ;6 00'S
7DF9 3600 01470 LD (HL),OOH
7DFB 0D 01480 DEC C
7DFC 20F8 01490 JR NZ,LP5
7DFE 3AFF7F 01500 LD A,(TRACK)
7E01 FE11 01510 CP 11H ;DATA ADDRESS IS
01520 ;DIFFERENT ON DIRECTORY
7E03 3EFA 01530 LD A,OFAH ;ASSUME IT IS TRACK 11
7E05 2802 01540 JR Z,TR11 ;IF IT WAS 11 DONT CHANGE
7E07 3EFB 01550 LD A,OFBH ;IT WASN'T 11 SO A.M.=FB
7E09 F5 01560 TR11 PUSH AF ;PROTECT AF FROM DRQ
7E0A CD8F7E 01570 CALL DRQ
7E0D F1 01580 POP AF
7E0E 77 01590 LD (HL),A ;DATA ADDRESS MARK
7E0F OEOO 01600 LD C,OO
7E11 CD8F7E 01610 LP6 CALL DRQ ;256 DA'S
7E14 36DA 01620 LD (HL),ODAH
7E16 0D 01630 DEC C
7E17 20F8 01640 JR NZ,LP6
7E19 CD8F7E 01650 CALL DRQ
7E1C 36F7 01660 LD (HL),OF7H ;GENERATE 2CRC'S
7E1E 05 01670 DEC B
7E1F 208A 01680 JR NZ,LP1
7E21 11EC37 01690 LD DE,37ECH

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7E24 1A      01700 LP7    LD      A,(DE)      ;LOAD FF'S FOR REMAINDER
7E25 CB47    01710      BIT      0,A        ;STILL BUSY?
7E27 2808    01720      JR      Z,DONE
7E29 CB4F    01730      BIT      1,A        ;DATA READY?
7E2B 28F7    01740      JR      Z,LP7
7E2D 36FF    01750      LD      (HL),OFFH
7E2F 18F3    01760      JR      LP7
7E31 00      01770 DONE    NOP
              01780
              01790      ;
              01800      ;WRITE CONTENTS OF
              01810      ;BUFFER BACK TO DISK
              ;
7E32 0600    01820      LD      B,0        ;SECTOR COUNTER
7E34 1604    01830      LD      D,4        ;ERROR COUNTER
7E36 78      01840 LPCO    LD      A,B
7E37 32EE37  01850      LD      (37EEH),A  ;LOAD SECTOR REG.
7E3A 48      01860      LD      C,B
7E3B 0C      01870      INC     C
7E3C 210070  01880      LD      HL,BSTART
7E3F 0D      01890 LPC1    DEC     C
7E40 2808    01900      JR      Z,FINC    ;CALCULATE BUFFER LOC.
7E42 D5      01910      PUSH   DE
7E43 110001  01920      LD      DE,256
7E46 19      01930      ADD    HL,DE
7E47 D1      01940      POP    DE
7E48 18F5    01950      JR      LPC1
7E4A 3E01    01960 FINC    LD      A,01
7E4C 32E137  01970      LD      (37E1H),A  ;CONTINUE DRIVE
7E4F 3AFF7F  01980      LD      A,(TRACK)
7E52 FE11    01990      CP      11H        ;WRITE COMMAND IS
              02000      ;DIFFERENT
              ;A5 FOR TRACK 11
7E54 3EA9    02010      LD      A,0A9H
7E56 2802    02020      JR      Z,TR11C
7E58 3EA8    02030      LD      A,0A8H
7E5A 32EC37  02040 TR11C  LD      (37ECH),A  ;FOR ALL OTHER TRACKS
7E5D E3      02050      EX     (SP),HL    ;LOAD CMD REG.
7E5E E3      02060      EX     (SP),HL
7E5F E3      02070      EX     (SP),HL
7E60 E3      02080      EX     (SP),HL
7E61 3AEC37  02090 LPC2    LD      A,(37ECH)  ;GET STATUS
7E64 0F      02100      RRCA
7E65 300A    02110      JR      NC,DONEC
7E67 0F      02120      RRCA
7E68 30F7    02130      JR      NC,LPC2
7E6A 7E      02140      LD      A,(HL)    ;DRQ SET. OUTPUT A BYTE
7E6B 32EF37  02150      LD      (37EFH),A
7E6E 23      02160      INC    HL
7E6F 18F0    02170      JR      LPC2
7E71 3AEC37  02180 DONEC  LD      A,(37ECH)  ;GET STATUS
7E74 FE00    02190      CP      00        ;TERMINATION WITHOUT
              02200      ;ERROR?
7E76 280B    02210      JR      Z,GOODC
7E78 15      02220      DEC    D          ;TRY AGAIN
7E79 20BB    02230      JR      NZ,LPCO
7E7B 32007F  02240      LD      (7FO0H),A

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7E7E 3E57      02250      LD      A,57H      ;ALL TRIES WERE BAD
7E80 32FD3F    02260      LD      (3FFDH),A ;"W" TO SCREEN
7E83 1604      02270      LD      GOODC    D,4
7E85 04        02280      INC     B
7E86 78        02290      LD      A,B
7E87 FE0A      02300      CP      10
7E89 C2367E    02310      JP      NZ,LPCO
7E8C C32D40    02320      JP      402DH
7E8F 3AEC37    02330      LD      DRQ      LD      A,(37ECH) ;WAIT FOR CONTROLLER TO
7E92 CB4F      02340      BIT     1,A      ;REQUEST DATA
7E94 28F9      02350      JR      Z,DRQ
7E96 C9        02360      RET
7E97 E3        02370      BUSY    EX      (SP),HL ;WAIT FOR CONTROLLER
7E98 E3        02380      EX      (SP),HL ;TO FINISH A COMMAND
7E99 E3        02390      EX      (SP),HL
7E9A E3        02400      EX      (SP),HL
7E9B 3AEC37    02410      LD      LPBUS    LD      A,(37ECH)
7E9E CB47      02420      BIT     0,A
7EA0 20F9      02430      JR      NZ,LPBUS
7EA2 C9        02440      RET
0000          02450      END
00000 TOTAL ERRORS
    
```

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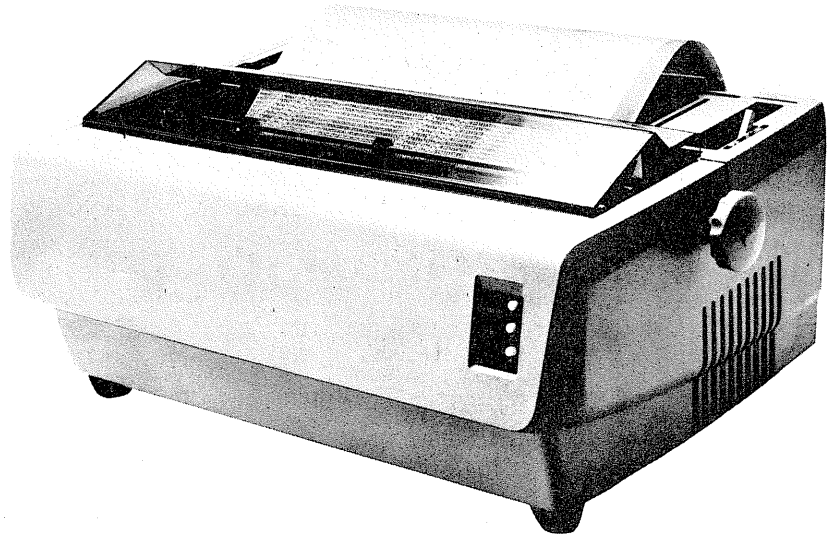
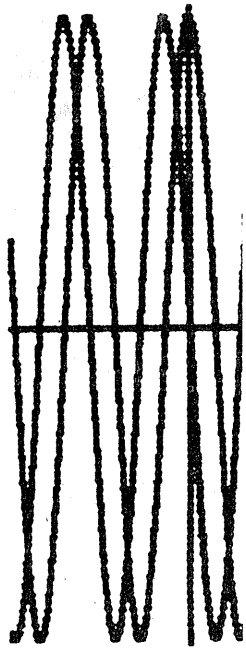
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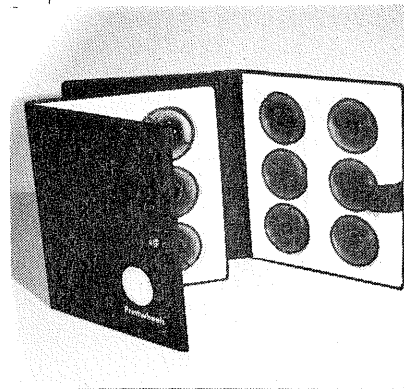
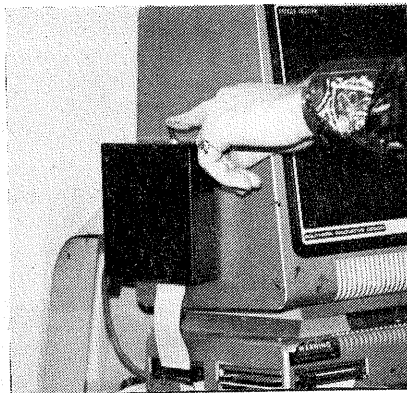
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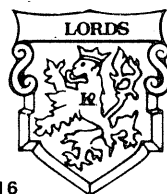
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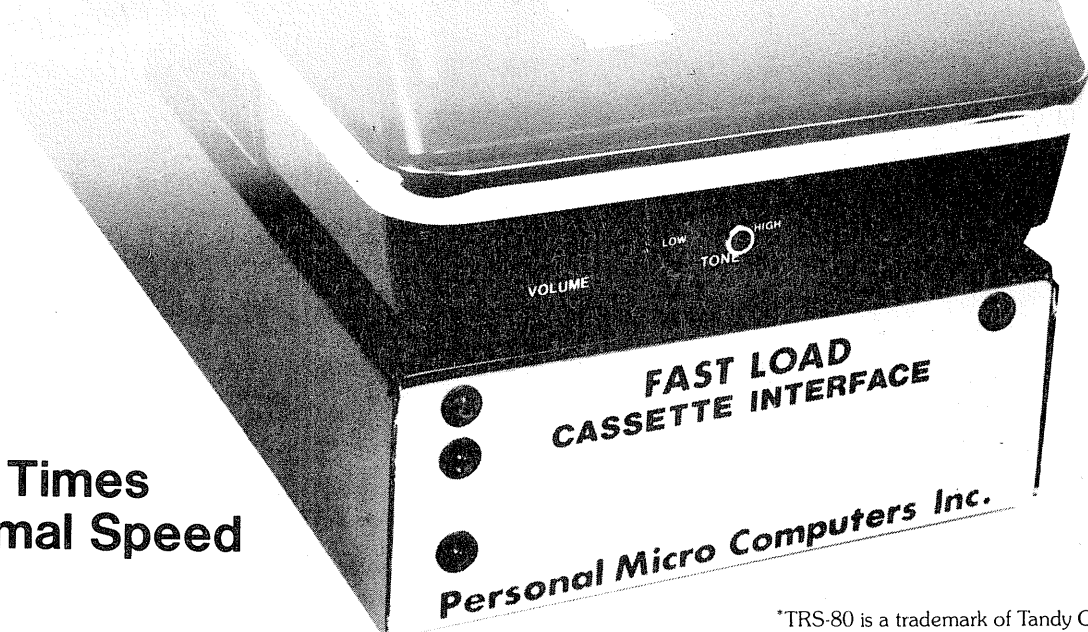
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Circle 26

# Lobo Drives International LX-80 Expansion Interface and Dual 8" Disk Drive Unit Evaluation

80-U.S. Staff

## Opening them Up

Both units arrived well packed and undamaged. Our first impression was one of good design and beauty. Both the interface and drive unit, which contained two 8" Shugart disk drives, have metal cases which should preclude any Radio Frequency radiation problems.

---

**"We experienced no rebooting, loss of data, or any other problems whatsoever with the LX-80."**

---

## The Manuals

The manuals are typical of most manufacturers - incomplete. They simply assume too much on the part of the owner. The writing is vague and confusing in some areas (especially the drive hookup area). We had our 5¼" floppy disk drive cable reversed because the manual didn't point out that this cable goes on upside down. The only manual supplied with the drives is the SA800/801 service and maintenance manual from Shugart. It is our understanding that a five-page addendum is being supplied to assist in setting up the LDOS operating system with the LX-80. This addendum has three sections which cover some of the shortcomings mentioned.

## The Test Installation

The test installation included the following configuration:

- Exatron Stringy Floppy
- Radio Shack 16K Level II Model I TRS-80
- Lobo LX-80 Expansion Interface with 32K and two RS-232 serial ports
- Lobo 8202CX SA800 dual 8" disk drive
- C Itoh TEC FP-1500 Starwriter I Daisy Wheel
- Radio Shack 5¼" disk drive (Shugart 35-track)

The cost of the LX80 is \$799 without memory or RS-232 capabilities. However, the manual does mention the fact that an owner may purchase chip sets and install memory without having a service shop do it. Our configuration, with 32K and dual RS-232 ports, is \$1049. The dual disk unit is \$1579., with an additional \$50. for the disk cable.

## Performance

During our tests, all equipment from Lobo performed better than expected. We experienced a typical windy spring day during the tests, in which the voltage of our power line fluctuated wildly. During this type of weather, the Radio Shack expansion interface would typically reboot. We experienced no rebooting, loss of data, or any other problems whatsoever with the LX-80. Credit that to a well designed and regulated power supply. If you take a look at the photos you will see the power supply of



the LX-80. The power supply of the disk drive unit is even more impressive.

The Exatron Stringy Floppy failed to initialize, and a quick phone call verified that the unit is not supported. While this is no big loss for most installations, the stringy floppy is a unit that should be considered while designing interfaces. It appears to be something that cannot easily be gotten around, as the LX-80 uses the empty RAM area between 3000H and 3FFFH for a ROM, which is the same area used by the stringy floppy ROM. Too bad.

The big news however, is the floppy disk controller. The 1791 chip, similar to the Western Digital chip used by Radio Shack, does a job on the older Radio Shack drives. We now have double density! The older drives have always been capable of double density and now there is no reason not to use them. With LDOS configuring the system, we can now get 568K (77 tracks) from each 8" drive and 152K (35 tracks) from each 5 1/4" drive. These figures are user space on formatted data diskettes. Total formatted space is 578K for 8" and 158K for 5 1/4", 35 track diskettes. The cost per byte for the total 1,183,774 bytes of storage on the 8202CX is \$0.001334 per byte. Adding the \$849 and \$1049 and \$50 for a total cost of \$3527., the cost per byte for total user bytes (1,222,064 memory and disk) comes to \$0.002886. A four drive Model II, in comparison, comes in at \$0.003301 per byte.

If you would use the maximum available in 8" drives - i.e., 8 double density, double sided disk drives - you could very easily achieve 9.25 megabytes of on-line disk storage.

We did not test the RS-232 ports in this unit, but expect they should perform better than Radio Shack's, as they are an integral part of the big board in the interface. For those with special needs in configuring the RS-232 ports, which are optional, they may be wired in any manner desired. As they come initially, they are not hooked up. There are two 24-pin jumper plugs in front of the serial connectors. These are removed and hardwired according to the user's needs. This eliminates the need for special cables in unique situations. LDOS can then be configured for baud rate, length, parity and so on.

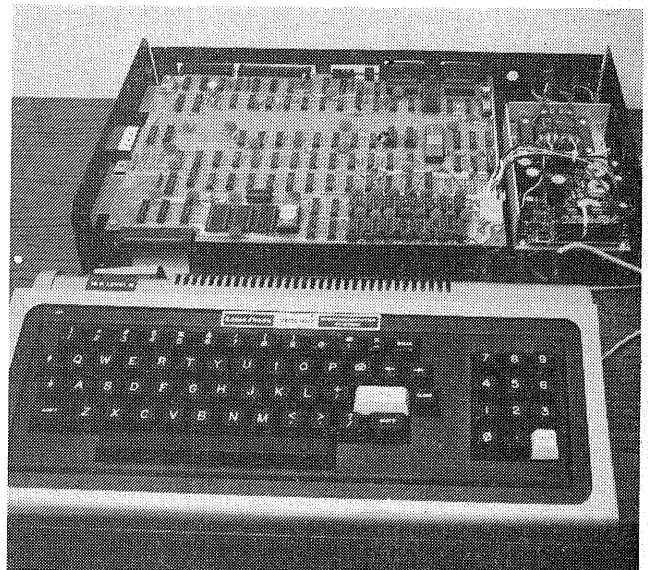
The LX-80 will support a hard disk in place of any one of the drives. We had none, and so this area was not tested.

Both the expansion interface and the dual 8" disk units performed as advertised. The quality of construction, hefty power supplies and other options available all speak of professionalism. With this equipment, the TRS-80 Model I is a very definite contender for a business installation. I would not hesitate at all to trust business software to this configuration.

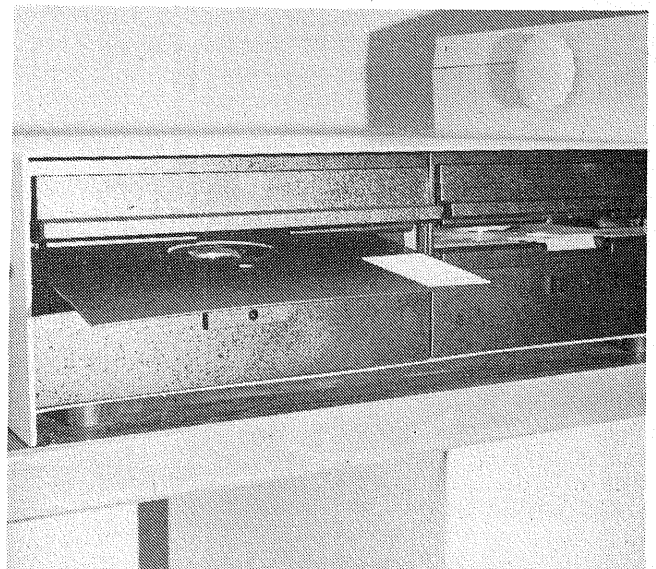
Indeed, Lobo has done an outstanding job and we feel the equipment is well worth the price. ●



Test Installation



LX-80 Uncovered - Note large power supply



The Dual 8" Drive Unit

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  - b) Turn off RTS,
  - c) Receive data only from terminal,
  - d) Receive data only from host,
  - e) Send data only to host,
  - f) Send data only to terminal,
  - g) Operate in duab terminal code,
  - h) Operate in ST80 mode,
  - i) Check CTS status. (clear to send)

This is a self relocating subroutine that can load anywhere in high memory.

**Communications hardware available**

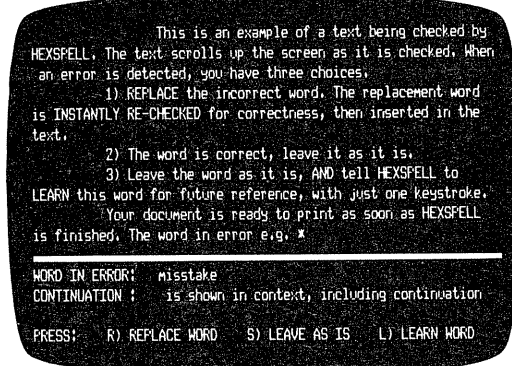


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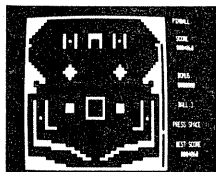
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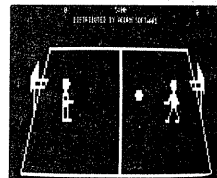
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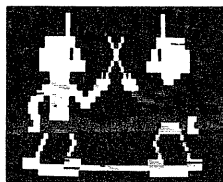


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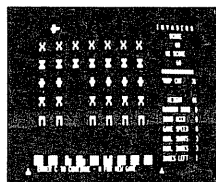


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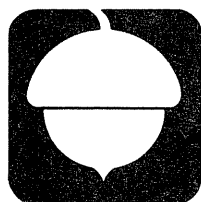
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For TRS-80 Model I

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# LDOS

## YOUR next Operating System?

LDOS, from Logical Systems Incorporated (LSI) is another of the many DOS's that have recently appeared. LSI is a new corporation which was founded with the sole purpose of the creation and promotion of operating systems. Bill Schroeder, president and majority stockholder of the new corporation, remains vice-president of the Galactic Software division of GS & WS Incorporated.

### An Upgraded VTOS 4.0?

This DOS has more misconception about it than any other. LDOS is rumored to be nothing more than an updated version of VTOS 4.0. This is

simply *not* true. While LSI did receive a license to use VTOS and LDOS does contain portions of the code authored by Randy Cook, the majority of this DOS is new code. This is evidenced by the 45 or so new commands and parameters beyond the VTOS configuration.

LDOS is the first DOS to make full use of the 1791-02 chip (compatible with Western Digital's 1791 chip) used in Lobo Drive's new LX-80 expansion interface (see preceding article) which supports a mixture of 5¼", 8" and hard disk drives in a number of formats, including single and double density, single and double

**Figure 1**  
Commands which are the same in both LDOS and TRSDOS

APPEND  
CLOCK \*  
DATE \*  
LIB  
LOAD  
RENAME  
TIME \*  
VERIFY \*

\* May be deleted from the operating system.

**Figure 2**  
Output of the Library Command DIR

```
Free space= 0.0 K Drive 0 LDOS-5.0 -- 05/05/81

Filespec Attributes Prot / LRL #Recs / Ext File Space Mod Date
SSL/CMD ALL / 256 44 / 4 S= 11.2 K 05-May-81
LBASIC/CMD ALL / 256 28 / 3 S= 7.5 K 05-May-81
L/BAS + ALL / 256 2 / 1 S= 1.2 K 05-May-81
PR23/JCL + ALL / 256 1 / 1 S= 1.2 K 05-May-81
PR2/JCL + ALL / 256 1 / 1 S= 1.2 K 05-May-81
SYSTEM/JCL + ALL / 256 1 / 1 S= 1.2 K 06-May-81
FORMAT/CMD IP EXEC / 256 17 / 2 S= 5.0 K 05-May-81
BACKUP/CMD IP EXEC / 256 18 / 1 S= 5.0 K 05-May-81
CONFIG/SYS P+ ALL / 256 4 / 1 S= 1.2 K 05-May-81
BASIC/OVN IP EXEC / 256 8 / 1 S= 2.5 K 05-May-81
PR/FLT P READ / 256 4 / 1 S= 1.2 K 27-Mar-81
BASIC/OVX IP EXEC / 256 10 / 1 S= 2.5 K 05-May-81
LOBO/DCT P READ / 256 2 / 1 S= 1.2 K 05-May-81
PRPAGE/JCL + ALL / 256 1 / 1 S= 1.2 K 05-May-81
```

sided and various track counts. What this really translates into is same size, same sided disks can be swapped between TRS-80 Models I, II and III, and some selected S-100 machines while operating under LDOS (as it becomes available for them). No one is doing that (NEWDOS80 for the Model III, perhaps, will allow Model I and III diskettes to be exchanged, but NEWDOS80 has not been configured for the Model II).

The production team for LDOS consisted of Bill Schroeder of Galactic Software as project leader, Roy Soltoff of Mysosis as systems analyst, and Roger Billings, Kirk Hobart, Chuck Jensen, Dick Konop, Tim Mann and Lance Micklus, as team members.

#### The Manual

The first thing about the manual is its completeness and readability. It comes in its own 1½" D-ring binder with sheet lifter. This is all very good, but it would be nice to have indices for the various sections (we understand these will be supplied in future editions).

The command syntax section of each instruction, be it library command, utility, or program section, is lacking in indication as which parameters are optional or unnecessary. While the text which accompanies each section illustrates the options, a quick glance just does not allow for a complete understanding of the syntax required.

#### Basic vs LBasic

LBasic is not included with LDOS, but is user created from Radio Shack Basic as contained on TRSDOS 2.3 in its original, unmodified condition. Should you be getting into disk use without any of Radio Shack's products, you will need to purchase TRSDOS 2.3 and the Model I TRSDOS/Disk Basic manual. The total cost should be less than \$21.00 from your local Radio Shack store. LDOS provides two patches which initialize LBasic without much trouble from Radio Shack's Basic.

LBasic occupies one to two additional K (1024 bytes) of memory in normal and block file modes, respectively. However, if a user program needs as much memory as can be allowed, LDOS supports Radio Shack Basic in its *unmodified* form and is the only DOS outside of TRSDOS to do so.

While LBasic doesn't add a lot of additional commands to normal Radio

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Shack Basic, the features are worth mentioning.

Upon entering LBasic, the operator may specify up to four options: 1) the number of file buffers to be set aside - default is three; 2) the highest memory address to be used by LBasic - default is that set by HIGH\$ (system); 3) an LBasic command, such as

```
RUN"MYPROG/BAS";
```

and 4) block file mode which allows file logical record lengths (LRL) to be less than 256 bytes - default is on.

LDOS Library commands, such as DIR, FREE, etc., may be executed directly from LBasic using the CMD"command" form and requires approximately 4K of free memory. The exceptions are those commands which modify the HIGH\$, or top of memory, location.

Four additional commands have been added to the CMD"" functions found in Radio Shack Basic: 1) CMD"O" turns off the [BREAK] key entry into the system debug utility; 2) CMD"P" sends the current screen information to the printer; 3) CMD"N" rennumbers the current LBasic program in memory (see further explanation of this feature below); and 4) CMD"X" provides a variable and line number cross-reference utility.

Sequential and Random (direct) access files have been improved. You can now add directly to the end of a sequential file by using

```
OPEN"E",buffer-number,"filename"
```

In random files,

```
OPEN"RN",buffer-number,"name"
```

will open and create a new file. If one already exists, an error condition will be created, leaving error trapping options open to the programmer. Likewise,

```
OPEN"RO",buffer-number,"name"
```

will only open an existing file, again generating an error condition if it does not already exist.

The other nice feature of LBasic is the block file mode of random files, which allows the use of more efficient file handling techniques through short record lengths as described in the "Files & Foibles" article of May/June 81, 80-U.S. Journal.

LBasic also upgrades the editor portion of Basic. You now may control listing functions with the up and down arrow keys and may enter the edit mode through pressing the comma key. [CLEAR] and up-arrow lists the

first line of a program while [CLEAR] and down-arrow lists the last. The period key will list the current line. Single character commands - L for LIST, E for EDIT, A for AUTO and D for DELETE - are supported.

#### The Line Renumber

The renumber function is a little different and may cause a few frustrations. Default increment between lines is 20, not 10. This is nice and allows for more space in inserting additional program lines. However, we grew up with 10 and prefer 10, thank you.

The LBasic program renumber will prescan for errors prior to actually renumbering any lines. If an error condition is encountered, no renumbering will take place. The command has an optional parameter to skip the scan for errors.

No matter what we did, we could not make this function misbehave. It would not allow creation for a program with line numbers out of sequence. If there are times you would wish to move a series of lines from one area to another of an LBasic program, resulting in lines that are out of sequence, this function will not allow it.

This Basic certainly doesn't have all the bells and whistles contained in other versions of Radio Shack Basic. But it does contain all the necessary elements to do a good job efficiently and effectively.

#### LDOS Library Commands

The commands in Figure 1 remain the same as TRSDOS. Abbreviations are allowed in many library commands. All of the library commands which are tagged with an asterisk may be deleted from the operating disk to allow for more disk space. The following commands have changed or are new to LDOS:

**ATTRIB\*** - The syntax here is slightly modified and the KILL protection level does *not* allow re-ATTRIB. However, ALL and FULL (the same as ALL) do.

**AUTO\*** - No syntactical changes here except the DOS-command may be up to 32 characters in length. With the addition of DO filename/JCL capability, full autoboot into any program is possible.

**BOOT\*** - Though new, accomplishes the same thing as pressing the reset button if no key is held down during the reboot process. However, if one or two keys are held during reboot, it is

possible for the system to bypass the SYSGEN configuration file, bypass the AUTO command file, enter the system DEBUG utility, or disable the keyboard debounce and key repeat function.

**BUILD\*** - This new command to Model I TRSDOS is similar to the Model II and III TRSDOS in that an executable DO file may be created. However, in LDOS this file is a JCL (Job Control Language) file, complete with its own syntax. It is very complex and allows for such things as operator keyboard input, conditional branching and so on. In short, it is an additional *language* which is *compiled* and executed from LDOS. In addition, Scripsit may be used to both create or edit a source file created for this language.

**COPY** - This is a command which, in addition to the normal copy functions found in TRSDOS, will allow copying from a device (such as the keyboard, or RS-232 channel) to a diskfile or visa-versa, and also between devices. Also, in normal copy modes a LRL may be specified and an option called CLONE will duplicate the directory entry of the original file being copied.

**CREATE\*** - This command is used to pre-create a file of a specified record length and size.

**DEBUG\*** - This utility in the LDOS library now has extended features. The normal DEBUG utility is functionally the same as the one found in TRSDOS. The extended portion includes a block move feature, allows you to type data directly into memory either in Hex or ASCII format, fill a block of memory with a specified byte, and has a feature which allows you to read or write disk cylinders (tracks) to or from memory for modification. In addition, there are many other features of the extended version for comparing, execution and movement through the utility. Very powerful.

**DEVICE** - While this command has not changed, the output is considerably expanded over TRSDOS. Specifically, one can now see the configuration of each of up to eight disk drives and the disk contained therein on the Lobo LX-80 interface, or up to four drives with the Radio Shack interface. The logical drive number will be displayed with size, type (i.e., floppy or fixed), physical location on the cable, number of cylinders (tracks), density and number of sides of the last disk accessed in that drive, stepping rate at which the

drive is set, and time delay imposed between motor startup and access time on minifloppy drives. In addition, the keyboard, video and line printer devices, and their associated driver locations are given. Also information concerning a job log control device, source input device, listing output to a device and a user created device. In respect to this last information, it must be realized the LDOS is quite device independent and can therefore, be used to set up "real" and "Phantom" devices.

**DIR** - This library function is also expanded in LDOS. Figure 2 shows a typical expanded directory of a disk. No longer is space expressed in granules, but now in K. Also included is a Mod date which is the date the file was last written to (dependent upon having the correct date in the computer). Also note the "+" symbol, which specifies that a file was written to since the last backup. Nice feature. Note also, the level of protection is now spelled out in plain English. The DIR may be used to list only those files of a certain type or name.

The screen is not cleared prior to execution of the DIR. Display scrolling will stop every 15 lines (nice for big directories) or may be caused to scroll non-stop. Finally, the display may be sent optionally to a printer.

**DO** - This command executes a previously assembled JCL file (as under the BUILD command). Since the JCL is a language, we simply do not have the space to discuss it here.

**DUMP\*** - This command is very similar to the TRSDOS command except that the dump may also be done in ASCII and terminated with a specified end of text marker.

**FILTER** - This powerful command allows for an I/O path through a machine language filter (translator?). The manual's technical section explains this in detail and includes examples. With this ammunition, a machine language programmer should be able to write his own FILTER program. Two such programs are supplied with LDOS: PR and KSM. The PR filter allows configuration of the line printer. We have used it at 80-U.S. to produce the line listings in this issue. With it, we were able to convert the up-arrow (which prints as a left-bracket) into the carat character as well as specify line length, page length, and number of characters to indent on line wrap-

around (we use 2). The KSM filter allows for using a Basic shorthand with the keyboard which should be a real boon to programmers.

**FREE\*** - This command is expanded slightly in LDOS and now displays the number of file directory entries still open, as well as the date the disk was created and the remaining free space in rounded K.

**KILL** - In addition to deleting a file from disk, this command can also kill (or cancel) a user created device.

**LINK** - With this command you may link together devices, such as the line printer and screen in either or both directions. You may also link to a diskfile through a phantom device created by the ROUTE command.

**LIST** - This command has been expanded to include a number of parameters not available from TRSDOS, including line numbering, setting tab expansion, starting at a specified line number, and output to a printer, all in ASCII mode; and a hexadecimal output where you may specify the beginning record number, the logical record length for display, or printer output.

**MEMORY** - This command allows the setting of top of memory, modification of a memory address, jumping to a memory address, and will return to the current top of memory address.

**PROT\*** - In addition to the current TRSDOS options, you may also change a diskette name with this command.

**PURGE\*** - In the words of the manual, "this command allows for 'controlled' multiple kills of disk files". Model II and III users will be familiar with this feature. Very handy for cleaning up a diskette.

**RESET** - This new command will restore all active devices and HIGH\$ to the normal values associated with those devices. HIGH\$ (top-of-memory) will be reset only if no background tasks are active (such as SPOOL, JKL, etc.).

**ROUTE** - You may now re-route I/O for a device or create a new one.

**RUN** - As a DOS command, this will load a machine language program and execute it. It is possible to do this on a single drive system from a data disk by using an optional parameter.

**SET** - This command sets a device to a driver routine, such as a serial printer driver or RS-232 driver.

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**SPOOL** - This command will establish a first-in, first-out (FIFO) buffer either in memory or on disk for a specified device such as a line printer.

**SYSTEM\*** - This command will allow for setting system parameters for CPU speed (if you have a clock speed-up kit); disabling the break key; creation of a blinking cursor; specification of drive type, speed, and number; setting up the JKL function, including optionally sending graphics to a supporting line printer; loading the lower case driver; setting up a type-ahead feature; and finally configuring the disk to automatically set up your parameters upon BOOT.

**TRACE\*** - This command will display the Program Counter address and is handy for running and debugging machine language programs.

**XFER\*** - This command might best be called the single disk owner's COPY command. It does *not* require LDOS to be present on either disk used.

### The Utilities

The Utilities included with LDOS are those necessary. While we missed an editor/assembler and disassembler, it would only be a loss to programmers using those tools.

As mentioned earlier, LDOS requires all disks to be formatted prior to use, as *none* of the utilities will automatically invoke this feature. Keep this in mind as we go through the utilities.

**BACKUP** - This utility is self prompting for the uninitiated or those who don't like to type in a bunch of parameters. It will allow complete duplication (even to the way the directory was written), partial backups of files in a "controlled" environment, or not having a system disk resident in drive 0. If you read the DIR information, you will note that updated files are flagged. It is possible, therefore to BACKUP ONLY THOSE FILES with this command. However, *be aware* that backup will not stop if there is already information on the disk. Only on disks with different pack ID's, will the operator be given the opportunity to abort the BACKUP under certain conditions.

The utility will allow for BACKUP between different disk sizes and densities and if more files exist than the destination disk will hold, the operator will be prompted to mount additional formatted disks until everything has been backed up.

**CMDFILE** - This is LDOS's answer to LMOFFSET and appears to be much more complete as it allows not only tape-to-disk and disk-to-disk manipulation of machine language files, but also disk-to-tape. In addition, two files may be appended; a single file may be offset with an optional driver routine to disable such items as clock interrupts and the keyboard debounce routines of TRSDOS, LDOS, or NEWDOS; a file may be appended with a patched code to correct errors in a manner similar to the PATCH utility described later; SYSTEM cassette tapes may be created from non-contiguous blocks of memory; and the load address range and entry point or transfer address may be displayed and printed. This utility is self-prompting and the manual is exceptionally clear and complete, even to the inclusion of explanations of the appendages.

**FORMAT** - This utility is completely self-prompting and allows for input of optional parameters including diskname; master password; disk density (if your controller supports it); number of sides (a two-sided disk is treated as a single-sided drive by LDOS); number of tracks; and the stepping rate if the disk is to be used in drive zero during boot. Eight-inch drives will always default to 77 tracks regardless of the parameter passed.

**LCOMM** - This utility is a complete terminal package allowing keyboard send/receive; spooling of a line printer through a dynamic buffer; file transfer between systems and so on. It is a very large utility and must be treated separately to be appreciated. It may be used in conjunction with KSM and other features of LDOS.

**PATCH** - This utility is common to the Model II TRSDOS and serves the same purpose here. It is used to make minor changes or corrections to existing disk files.

### Other Features

LDOS includes an RS-232 driver for use in configuring the RS-232 serial port(s) in expansion interfaces. The KSM filter allows the use of files containing pre-defined phrases for direct keyboard entry. The PR filter is used to format the data sent to a line printer, including: addition of a line feed after a carriage return, number of characters per line, issuance of a HEX OC instead of a series of linefeeds for top-of-form, number of characters to

be indented on wrapped-around lines, number of lines printed per page, page length in lines, setting of left margin, character translation and expansion of HEX 09 tab characters.

The JCL is contained in its own portion of the manual. It is our understanding there is a tutorial being prepared to aid in the use of the JCL feature of LDOS.

The technical section of the manual is quite inclusive for machine language buffs who want to explore disk operation. It includes many calls and routines, as well as explanations of features unique to LDOS.

The LDOS disk contains patches to Scripsit and Electric Pencil. The Pencil patch causes Pencil to honor HIGH\$ (top of memory) and to use the standard keyboard driver and the KSM filter. The patch may be read by Pencil and modified should the user want part or all of the features added.

The Scripsit patch forces it to use the active printer driver, honor HIGH\$, corrects a stack problem and adds a "Q", or "Query" DOS directory command. It does a couple of other things which are fully explained in the remarks section of the file. Again, as in Pencil, Scripsit can read the FIX file.

### Conclusion

Without a doubt, the outstanding feature of LDOS is the manual.

If one uses only Radio Shack Basic, LDOS has to be classified as one of the easiest to use DOS's. LBasic with the preceding "L", confused those not used to it.

The solid support in the form of a very responsive group on the other end of an 800 number helps tremendously. By the same token, don't expect help if you pirated yourself a copy.

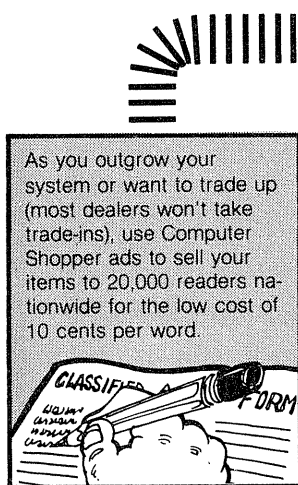
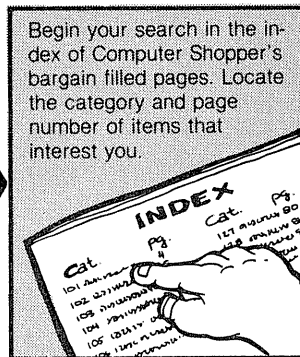
At 80-U.S., LDOS has become a real workhorse, since it fully supports any unmodified TRSDOS based programs and allows for printer configurations available only previously as special driver programs.

Evaluating this (or for that matter, any other) DOS is difficult at best. We worked with it for over two months and have yet to fully exploit all its virtues. If you do get this DOS, put away all your other operating systems (as we were forced to do while using the LX-80) and give it a chance. We believe you will come to the same conclusion - LDOS is indeed the state of the art in operating systems. ●



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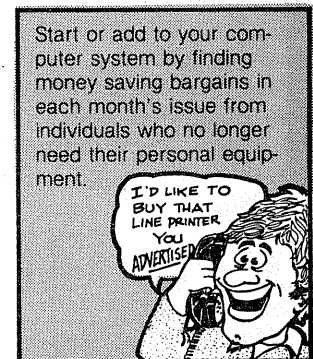
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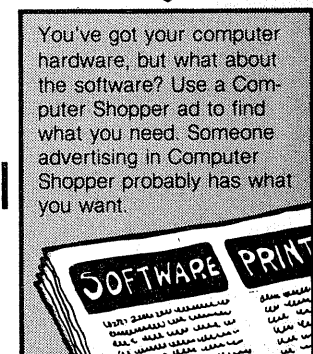
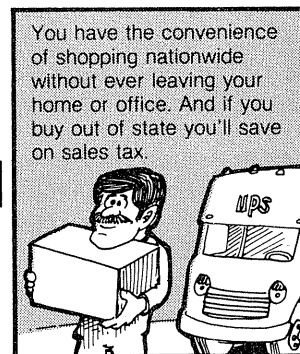
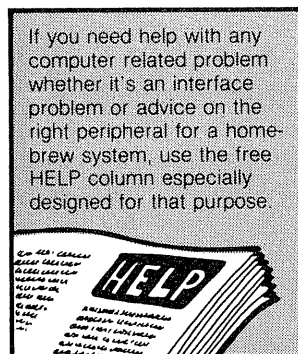
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Bob Liddil

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Here's Joe Sysop, hacking away at the keyboard of his magnificent, spectacular, colossal, better-than-any-other-in-the-world computerized bulletin board service (BBS). Bleary-eyed, I type away on my Electric Pencil, formulating files, allocating space and consecrating disk drives, all in the hopes that my board would soon be up and running.

So begins the saga of Aggravation-80, the first CBBS to ask the question, "Can I ever get this thing on-line?"

It began innocently enough. I bought myself a modem and a copy of Omniterm, an excellent Smart Terminal program, and then began dialing up semi-local CBBS's like the Forum-80 in Nashua, New Hampshire. At the time my phone bill was around thirty dollars a month. I was bitten by the bug.

Next, I visited Richard Taylor (at his new Programs Unlimited retail store) to check a program called Message-80. I received a program, loosely known as Connection-80, which is a carefully formulated BBS with a special electronic mail order section designed to curb hunger at my house through the sale of a few bits and pieces of software. Written by Richard Taylor (his talents know no boundaries) and Tom Vandestowe, of the Microperipheral Corporation. His

imagination is vast and besides, his auto-answer modem was in stock. Now, I figured that my board had a fighting chance.

Arriving home from New York, I discovered that my new 40 track MPI B51 disk drive had arrived from Level IV. Since I'd had no trouble with the other MPI drives purchased from them, I expected none from this one. With my brand new, un-backed up BBS software in drives zero, one and two, and with the doors open for safety, I hooked up drive three. ZAP went the software.

I could've just spit.

I called Level IV on the phone and pitched a fit. It was the middle of the evening and I figured that the \$%&() drive had munched my disk in some sort of death throes of its own. I was wrong. It was the idiot installing the drive who'd caused the trouble, namely, me.

Chuck Chesseldine of Level IV listened to my piteous cries and then asked if I had Super Utility, a disk utility from Breeze Computing which no disk system user should be without. I said I did. Together, by long distance, we repaired my disk and un-munched my precious programs.

Meanwhile back at the board, we struggled for several hours to put Magazine-80, as we called it, on line.

Almost instantly a flood of well wishers began to sign on at a rate of about one per hour. The last of which was none other than the most illustrious and personable Larry Kelley, Sysop Extraordinaire, and proprietor of \* M O M \* (Modem Over Manhattan), otherwise affectionately known as Maniacs On Modems. Larry left a most kind message of welcome and greetings, signed off and took the entire Bulletin Board back to Manhattan with him. I just sat there, staring in disbelief as three 5¼" Verbatim diskettes packed their little suitcases and went west in a cloud of shattered magnetic particles, waving bye-bye, as they departed.

Arrgghh! I felt like Charlie Brown at the kite-eating tree. My new BBS blinked "READY FOR CALL" three times and died.

But Joe Sysop never says die! Once again I redumped my shattered program, this time from a backup, which had been thoughtfully placed in reserve by my roommate and assistant Sysop, Jamie Tietjen. Again we were up and running. That was five o'clock on a Friday. At 6 PM someone up the road (rumor has it) (allegedly) took a pair of 36-inch bolt cutters to a long distance phone trunk.

For three days after that the phone ceased to exist...

Despite all the trials and tribulations, Aggravation-80, that crashing, frustrating, complicated collection of misfit hardware and software; became Magazine-80, a clean running, smooth and satisfying specialty Computer Bulletin Board Service with features the creative writing efforts of many New Hampshire area computerists.

Being a Sysop takes patience. It's not for the easily angered. It also takes (in most cases) a dedicated system and a dedicated phone line. The software involved is available in a variety of places.

Bill Abney's Forum-80 is very popular and seems to be the most widespread of the TRS-80 BBS programs. The rules are strict here, however, and the formats most rigid, except for the local features section, which seems always to include downloading. There are no fees involved for the software but I suspect that getting a Federal Grant for research on the mating habits of

vegetarian Aardvarks is easier than getting licensed to operate one of these.

Richard Taylor's Message-80, the base program for my Connection-80, is inexpensive at around \$150 and very flexible as to which modifications can be made to it. I concentrated the theme of my board around program reviews (which I have in the most abundance), short stories, poems, and a BBS edition of Captain Eighty. Richard's reaction to these modifications was an enthusiastic (but dignified) go for it!

Along the course of becoming a Sysop (and it is an honor to be declared such by those who already are), I have discovered a whole world of new personalities. It is not unlike that which CB radio used to be back in the sixties. Everyone is a friend and has a stake in the order of things.

It's an eerie feeling to sit passively by while someone from the other side of the country takes control of your computer, your brainchild, which you

have nurtured through power failures and bouts of Shroyer's revenge. But it's all worth it when he's read your articles, downloaded the only public domain program in New Hampshire, and leaves a messenger for you and everyone to see: "NICE BOARD, WELCOME". That's a true, pure, natural high.

Here's Joe Sysop, in the twenty-third hour of a marathon attempt to log on to every Bulletin Board in the country. There is a wrecker pulling into my driveway. It is painted in Bell Telephone colors. It's hooking up to my van. WAIT A MINUTE!!

My connection to ALOHA-80 in Honolulu is complete. I log on.

"Don't take my van!!" I cry in vain. "What's a three thousand dollar phone bill among friends?"

ALOHA-80 dumps me off for lack of a password.

The sun goes behind a cloud.

Somewhere a pair of bolt cutters lurks in the shadows.

It's going to be one of those days. ●



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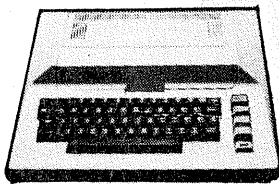


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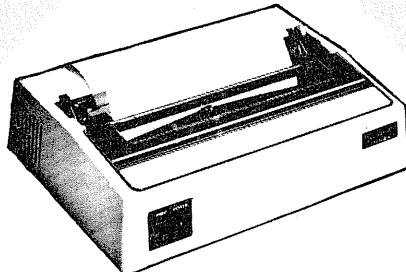
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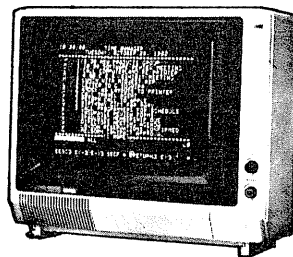
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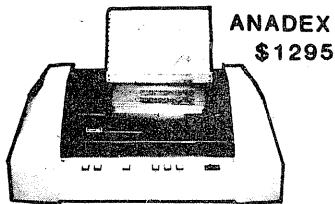
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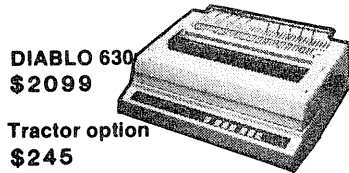


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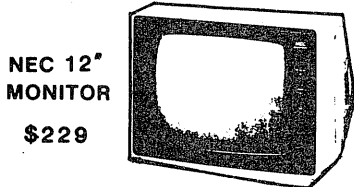
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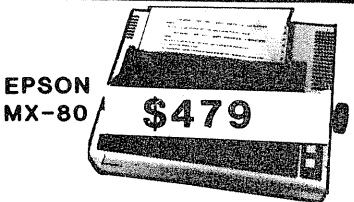
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# @NEWS

## (Stringy Floppy Owner's News)

By Jim Perry

This issue's column was typeset directly from my original Electric Pencil files. By using a special interface program I was able to drive a \$65,000 CRT Autologic micro 5 typesetter. The machine belongs to a company in Anaheim, California, called Pacesetting Services. In a future column I will give details of how anyone with a Stringy Floppy (or disk system) can get typesetting done this way, it's very fast and quite cheap.

### FMS Modifications

Joe Carrier has made some modifications to the File Management Program, and now gets page titles and numbers plus marks every 66 lines. The marks enable you to use roll paper, and easily cut it to put in a normal binder.

These modifications only affect the X command, the existing P (Print) command is unchanged. Line 20 is modified, line 4000 is replaced and six new lines are added.

```

20 CLS:PRINTTI;"COMMANDS
A - ADD","J - JUSTIFY","R - RANGE
C - CHANGE","L - LIST","S - SORT
D - DELETE","M - MAP","T - TOTAL
E - EXTEND","N - NEW","V - VALUE
F - FIND","P - PRINT","W - WRITE
H - HIDE","Q - QUIT","X - TITLE, PAGINATE & PRINT
"CL;

685 IF PEEK(16425) >= 61 AND Q="X"
    THEN GOSUB 5000 :GOSUB 4040

705 IF Q = "X" GOSUB 5000

4000 INPUT"TITLE OF TABLE";TT$:
    Z1=40-((.5) LEN(TT$)):
    EE=1:LPRINT STRING$(80,"-")
4035 GOSUB 4040:GOTO 600
4040 POKE 16425,0:FOR E1 = 1 TO 5:
    LPRINT CHR$(138):NEXT E1:
    LPRINTTAB(Z1)TT$
4065 IF EE>=2 THEN LPRINTTAB(37)"PAGE";EE
4070 FOR E5 = 1 TO 2: LPRINT CHR$(138):
    NEXT E5: RETURN
5000 FOR E2 = 1 TO 66 - (PEEK(16425)):
    LPRINT CHR$(138):
    NEXT E2: EE = EE + 1:
    LPRINT STRING$(80,"-"): RETURN

```

### Lots of Machine Language

When trying to @SAVE large machine language programs you can run into problems, if the end address is above 7FA6 on a 16K machine. If the end address is below 7FA6 then the procedure given in the owners manual will work successfully, otherwise you can use the following technique - developed by Dr Lichen Wang.

Determine the start, end and auto execute addresses for the program. If the end address is above 7FA6 then the Stack of a 16K machine would be wiped out, type in the following BASIC program:

```

10 FOR I = 16421 TO 16425
20 POKE I,0
30 NEXT I
40 POKE 16802,240
50 POKE 16803,195
60 POKE 16804,151
70 POKE 16805,25
80 POKE 16548,38
90 POKE 16549,64
100 POKE 16633,40
110 POKE 16634,64
120 POKE 16561,161
130 POKE 16562,65
140 CLEAR 0
150 @LOAD2

```

Do not run the program, yet. Save it as file 1 onto a wafer long enough to hold both it and the machine language program.

Delete line 150 (@LOAD2), and execute the program. Now load your machine language program from cassette, but do not execute it. Go back to BASIC, then @SAVE the machine language program as file2 on the wafer.

To load the machine language program use @LOAD1.

### BASIC Bondage

When chaining BASIC programs, as described in the owners manual, you may run into the same problem that Ronald Hartloff from Puyallup, Washington, did. His letter follows:

Upon calling up a second program I have found that the data was destroyed. After repeated attempts at chaining and experimenting, I have found that the second program must not contain a CLEAR statement. It seems that since the chained program automatically executes it wipes out all data with the CLEAR statement. Removal of the CLEAR statement cured the problem.

Since a CLEAR statement can't be used by the second program, sufficient space must be CLEARed by the first program for all subsequent programs. This has made it impossible for me to chain the Radio Shack Cassette Portfolio program, on my 16K machine. The size of the initial program is so large, if I CLEAR enough space for subsequent programs an Out of Memory error is produced.

I am presently experimenting with the possibility of resetting the Variable Pointers with POKE statements, thus providing additional space without destroying stored data. An alternative would be to divide the initial program into two programs, one for stocks the other for bonds. I will let you know how successful I am in the future.

**Stringy Strings**

To follow on from Ronald Hartloff's caution about CLEAR statements, *Wee Willy* sent in some information about String Variable data.

When passing String Variable data from one program to another you may get into trouble, unless you take some precautions. Unless the String Variable gets put into the String storage area, it will not get passed to the next program. The rules for this are as follows:

If a String is set as a constant in a program, for example:

```
10 A$ = "Hello"
```

Or if it has been READ from a DATA statement, it will remain in the BASIC program - not in the String Storage area. By using the VARPTR command you can take a look at the location of any String, in this example VARPTR(A\$) would point to an address in BASIC.

When a String is entered as the result of an INPUT statement, such as:

```
10 INPUT "Name please";A$
```

Or when the String has been concatenated (anybody know how to pronounce that word?), such as:

```
10 A$ = "Hello" + "there"
```

Also when a String is defined as a CHR\$, like:

```
10 A$ = CHR$(65)
```

The String will be placed into the String storage area, and be available to a following chained program. If you try these examples, and then use VARPTR, the storage address will be in the String storage area.

Sometimes you are confronted with the problem of defining a String as a constant, but wanting it in the next program. A simple solution is to concatenate it with a null String:

```
10 A$ = "Hello" + ""
```

This will put the String where you want it, but not change it. In a future column *Wee Willy* has promised to give a simple program for examining memory, and seeing the VARPTRs change 'before your very eyes'.

**Improved Wafers**

If you've had any problems with wafers, such as the tape pulling out, then send them back for replacement. A small batch of rogue tape slipped into the production line, it was slightly thicker than it should have been, and has caused some problems. The tape now used is the correct thickness, and new moulds have been designed for the wafer housing. So if you have any wafers that have suffered the dreaded tape pull-out send them to Exatron for exchange.

**Extended BASIC**

ESF Extended BASIC is a new program, written by Tom Wheeler of Missouri, that makes your Stringy act like a slow disk system. New commands that are recognized by Extended BASIC include CMD'I' (formats a blank wafer, and puts a clean directory file in place), CMD'D' (displays a directory of files on the wafer), CMD'DL' (directory, with file lengths), SAVE'PROGRAM/EXT' (allows you to save a program by name, with an extension) and LOAD'PROGRAM/EXT'(the reverse of SAVE). Other new commands include GET, LOF(N), EOF(N) and KILL'PROGRAM/EXT'.

With these commands you can easily emulate a disk system, and use random access techniques to manipulate data. Programs can be chained together (one program can load another, and run it), and you can even assign passwords to programs. As a bonus there is a command called LINE, which produces sound out of the cassette port. With it you can specify both the frequency and duration of the sound (LINE Frequency, Duration).

Complete with a 24 page manual ESF Extended BASIC is priced at only \$25.00. The only drawback that I have found is that some machine language files overlay the ESF Extended BASIC area, but this can be worked around. A very good program.

**Color Memory**

If you have a TRS-80 Color computer then Exatron has some good news - a 32K memory expansion box for \$199.00, plus a disk controller interface for an additional \$99.00. Details were still being finalized as I wrote this, so if you are interested give Exatron a call on 800-538 8559 (in California 408-737 7111).

**Next Column**

Next time around the Electric Spreadsheet review, no room this month, and more tips from owners. My @NEWS address has changed to P.O. Box 1681, Upland, California 91786, write and let me know what you would like to see in future columns.

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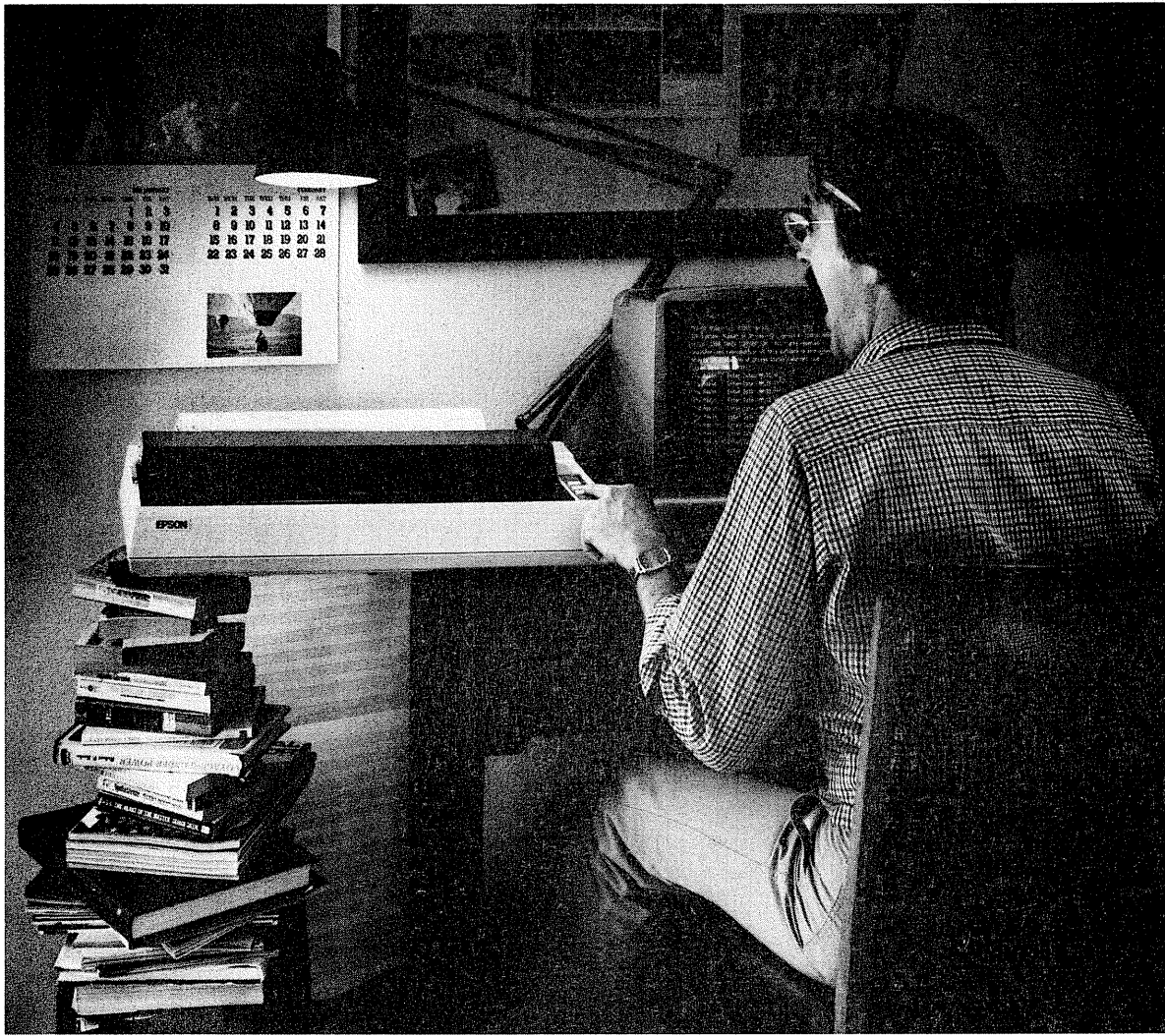
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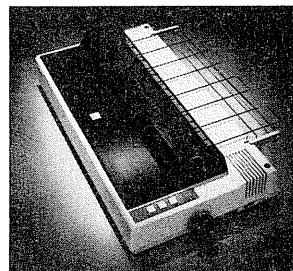
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beyond just the specs; something about the way it all comes together, the attention to detail, the fit, the feel. Mere words fail us. But when you see an MX-100, you'll know what we mean.

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## LUNAR LANDER

By Wall & Moncrief from Adventure Int. Calling this program simply "LUNAR LANDER" is like calling the Space Shuttle an "AIRPLANE" -- they are so much more than the names imply! And like the Space Shuttle, this great simulation will get used again, and again, and again...

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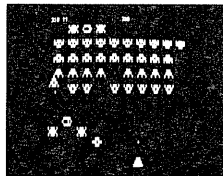
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16K, includes 2 Starmaps, 308 tokens, rule book, program listing and tape...\$14.95

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By Hogue & Konyu from Big-Five  
"The rage of the arcades" is now available for TRS-80! Exciting sound effects add to the action as the invaders swoop down to destroy your base. Even while you have your hands full battling the aliens, you have to watch out for the Flagship! Super graphics, super action, super fun!

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This two-game package combines sound and graphics to provide hours of fun for all ages. Both games can be played against the computer or as two-person games.

WORD CHALLENGE depicts the length of a phrase. The phrases are either computer generated or typed in by your opponent. The player's challenge is to figure out the phrase, based on the letters guessed.

WORD GAME allows many levels of strategy as you try to guess the letters of a mystery word. The strategy comes in because each letter has points based on its frequency of use in English language, and you are told how many points the mystery word contains.

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## Honestly...

... we run into the same problems you do. With so many good programs available, it is hard to choose among them. Our solution is to try to stock them all, but that doesn't solve your dilemma. So, we will regularly offer this column of straightforward comparisons of similar products. Since everyone has different needs, we hope to give enough information to help fill yours. We strive to present factual comparisons of features; the opinions offered are purely subjective, however. If our opinions offend any authors or publishers...

## BLACKJACK

### AMAZING BLACKJACK MACHINE

By Richard Ramm from Adventure Int.  
Not a blackjack playing game, this program uses your playing and betting strategies to play hands automatically -- at up to 2000 hands per hour! It also allows testing yourself on the playing of difficult hands. The betting strategies, both built-in and user defined, are based on point count systems developed by Edward Thorp and refined by Lawrence Revere (the built-in tables seem to be based on Revere's book, "Playing Blackjack as a Business").  
The program works well, and while it doesn't allow such subtleties as "insurance" and "surrender," it gives fair leeway in defining various "house rules" and number of decks (up to six). The documentation is scanty -- if you are new to serious blackjack playing and counting, some outside reading is essential to get the most from this program.

16K Tape...\$19.95

### BLACKJACK MASTER

By Norman Wazaney, Jr. from Hayden  
With four operating modes, BLACKJACK MASTER acts as tutor, high speed betting and playing simulators, and computerized dealer. It deals hands from four "decks" using casino rules. While you cannot customize the ground rules to fit a particular casino, this should not be a problem for the average player.  
The game portion is one of the best "one-on-one" blackjack dealers we've seen. It allows splitting pairs, doubling, insurance and surrender. The simulator options let you define betting and playing strategies, but do not allow point-counting. Insurance and surrender are not supported in these high speed modes. The computer plays the chosen number of hands and reports the outcome. The "tutor" drills you playing decisions based on the dealers "up" card.  
The program should aid in developing good basic skills for casual blackjack playing. The 60 page manual is useful to novice through expert.

16K Tape...\$24.95 32K Disk...\$29.95

### CASINO BLACKJACK/COUNTER

From Manhattan Software  
This program comes closest to being a pure blackjack dealing game, but with useful differences. You choose the number of decks (1, 2 or 4) and the dealer's speed (useful in training for quick casino decisions and point-counting). Cards are dealt to five players. The computer plays four hands; you play the hand in the middle. Splitting, doubling, and insurance are supported, but surrender is not.  
On your request, the program will tell you the current point count and recommended bet size. Documentation is adequate, but requires outside reading if you wish to learn point-counting.

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### WIN21

By Phil Pilgrim from Discovery Bay  
While it can be used just for fun, WIN21 is designed as a serious learning tool. It lets you define the number of decks (up to four), how many hands you will play, the number of computer-played hands on either side of you, and the basic "house rules." The strength of the program lies in your ability to exercise various options for betting, counting, and playing: You can let the computer do some of the functions while you work on others; the computer can instruct you in some or all of the functions; it can just point out errors in your play; or it will leave you alone (but will score you based on how you bet and play). The only weaknesses are in not allowing six decks (a common casino practice), and in not supporting "surrender" (an occasionally useful, but sophisticated option).  
The package includes Dr. E. Thorp's book, "Beat the Dealer," which is a little dated but still quite valid. If you are willing to practice, the program can teach you to be an excellent player.

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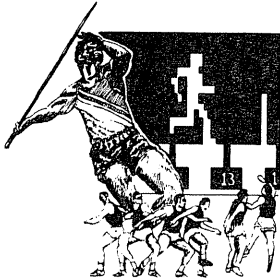
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By Timothy Smith from Microsoft  
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Play alone or with as many as eight competitors, the gold medal will always go to the skillful -- never the luckiest -- because your score depends entirely on skillful manipulation of the keyboard.

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## COSMIC FIGHTER

By B. Hogue & J. Konyu from Big Five  
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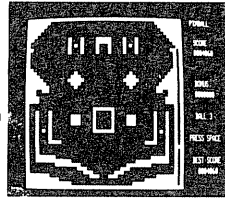
## PROJECT OMEGA

By Bob Nicholas -- Adventure International  
In probably the most accurate simulation ever produced for a microcomputer, you are responsible for the production, finance, health and well-being of Project Omega, the Earth's first deep space colony.

Painstakingly researched, Project Omega will provide much enjoyment and satisfaction as you overcome the frustrations and obstacles of taming an uncharted environment. The tape version is for one player; the disk version supports one or more, plus a special tournament option.

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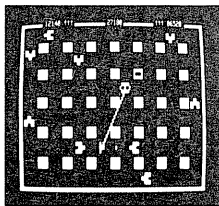
## PINBALL



By John Allen from Acorn  
Get your flipper fingers ready for action in this real-time, machine language game.

Lots of sound and flashing graphics make this fast action game so much like the real thing that you'll have to remind yourself not to shake your TRS-80. Choose from five playing speeds to match your skill. Can you beat your friends' scores? Will you avoid the dreaded "Bermuda Square?" Get PINBALL today and find out.

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## ATTACK FORCE!

By B. Hogue & J. Konyu from Big Five  
Unlike the usual space "shoot-em-ups," your ship is not tied to the bottom of the screen. In Attack Force, you use the arrow keys to control both speed and direction as you maneuver all over the screen in search of the alien Ramships and Flagships. A realtime, machine language game with amazing graphics and sound.

You have to be quick to avoid the enemy ships that warp down on you, and the Flagships' lasers can fire in all directions -- even diagonally! And don't look away for an instant because one of the alien spacecraft might be transformed into a mirror-image of your own!

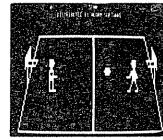
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ZORK



By Infocom from Personal Software  
In Zork, the Great Underground Empire, unearthly creatures guard 20 treasures. Bring all the treasures back to the trophy case and you can leave alive! You must pick your way through intricate mazes, collecting objects that may help or hinder you in your quest. But keep your wits about you, because in Zork, they take no prisoners!

TRS-80 or Apple II, 32K Disk...\$39.95

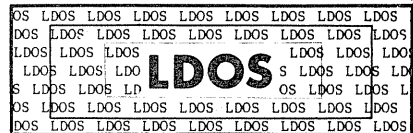


## BASKETBALL

By John Allen from Acorn  
You have to be fast to keep up with the action as you try to outscore your opponent in five minutes of one-on-one basketball. Compete against a friend or your computer.

Steal the ball, duck around your opponent and slant toward the basket for a lay up! The graphics are based on a 3-dimensional depiction of a basketball court, and ball dribbling sounds add to the realism.

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# DOSPLUS 3.3

**Pete Carr**  
Port Orange, Florida

In the Jan/Feb 81 issue of *80-U.S. Journal*, we compared NEWDOS80 and VTOS 4.0 Disk Operating Systems (DOS) for the Model I TRS-80. If you look back at the summary in that article we described a "dream DOS" which would contain certain features of NEWDOS80 and VTOS 4.0 in one system.

DOSPLUS 3.3D has most of the features wanted, is easy to understand and use, and is dependable. It's from a company in Hollywood, Florida, called Micro Systems Software.

At the time of this writing, Micro Systems Software is offering two DOS's: DOSPLUS 3.3 (single density), and DOSPLUS 3.3D (the D stands for double density). In actual use the commands and features are basically the same for both. We will be discussing both versions here, except where noted.

An earlier version of DOSPLUS, 3.1, was reviewed in the Nov/Dec 80 issue of *80-U.S. Journal*, and did not have all the features of 3.3. Owners of the earlier version can obtain the latest version and manual by returning the original disk and manual to the manufacturer.

To use DOSPLUS 3.3D, you have to buy a product from Percom Data, called the *Doubler*. It's cost is about \$220.00. It is an add-on board that you install inside the expansion interface which gives you almost twice as much disk storage space. It is easy to install; you just plug it in. With the doubler you can keep using your old single density program disks as well. If you need more disk storage for your Model I business data/files or programs and don't want to buy the new TRS-80 Model III to get it; this definitely offers you an alternative.

Note: Your disk drives must be tracking precisely and be in perfect alignment to use double density. When first received, the doubler caused a lot of problems when formatting and saving programs. No problems at all in single density. Percom told us it was probably the floppy disk drive and alignment. Some disks seemed to work better than others. A new AEROCOMP 80 track drive formatted and saved programs very reliably. Your disk drives may work great in single density, but double density is much more demanding and requires precision alignment of the drive heads. Percom does offer a resistor and read/write head modification that will make older drives work more reliably in double density. If you have problems, and are using quality diskettes, the disk drive is probably the culprit. (As of this writing, both Percom and LNW have just started offering new double density modification kits for the Radio Shack interface and are said to be less critical. The new LNW mod does seem to overcome earlier problems experienced with the older Doubler from Percom. We have not tested the Doubler II.)

What's really great about DOSPLUS is that it will read, write, DIR, FREE, etc., your old single density disks along with your new double density disk. The new Model III under TRSDOS won't do that. With DOSPLUS you don't have to learn new commands to use single or double density disks. You just insert the double density version in drive 0, then insert any disk (single or double density) in your other drives and you are ready to go. DOSPLUS takes care of the rest. For example, to FORMAT a disk in drive 1, you just enter "FORMAT :1". No need to use any special syntax.

DOSPLUS 3.3D comes with a 19 page user guide. It isn't the most complete manual, but it does clearly explain how to use the system and all its features. It is a user manual, not a technical manual, and it assumes that you already have the TRSDOS manual. Micro Systems has indicated that they will start shipping a more complete manual with DOSPLUS very soon.

DOSPLUS was available before Model III DOS, so it is not a copy or modified version of it, though it is similar. Both DOSPLUS and the Model III TRSDOS borrow heavily from the Model II TRSDOS.

## DOSPLUS's BASIC's

There are two Basics included with DOSPLUS at this time. They are completely rewritten in Z80 code instead of the older 8080 code, which makes them more efficient in time usage and memory. One is called "BASIC" and the other "TBASIC" (Tiny Basic). The general difference is that with BASIC you are allowed to execute any system program or command from Basic (DISKZAP, DIR, FREE, CLRFILE, FORCE, etc.) and return to Basic, or your Basic program, and continue execution. The syntax for this is "CMD"command". If you want to return to DOS from Basic, just enter "CMD"; no need to enter "CMD"S", like the other DOS's.

Like the Model II, Basic does not allocate any user files unless you specify them when you load Basic. If you are going to use disk data files you must use the form "BASIC -F:3". This would allocate 3 buffers for your data files. A more extended form is "BASIC program -F:3 -M:61000", where the machine will load Basic, allocate 3 files, set memory size to 61000, and run the Basic program.

With TBASIC you have all of the regular Basic features available, but you cannot use any "CMD"DOS command". The error messages are also shortened ("SYNTAX ERROR"="SN"). For this sacrifice what do you get in return? Over 40,000 bytes of free user memory for your programs with a 48K computer. It depends on what you are doing and what your needs are as to which one (BASIC or TBASIC) would be the best. One possibility is to write your programs with BASIC, then run them using

TBASIC and take advantage of the extra memory available for arrays and string space. Both Basics are compatible with Radio Shack (Microsoft) Disk Basic.

The end of a sequential file may be written to with the OPEN "E" command and the OPEN "D" command is like the Model II Basic (the command is identical to OPEN "R"). Logical record lengths less than 256 bytes are also supported. After you write a random file program using shorter record lengths you will not want to go back to the old cumbersome way of having to sub-block your files for the 256 byte buffer. DOSPLUS automatically lets you use shorter record lengths or the standard 256 byte record. You specify which type of file you want to use in the BASIC OPEN statement:

OPEN "R",buffer #,1,"filename",record-length

DOSPLUS Basic has a shorthand edit feature that goes beyond the rest. The usual R for RUN, L for LIST and A for AUTO are included. But even nicer is L "Program name" for loading a program; S "program name" for saving a program and R "program name" for loading and running a program.

The DI and DU commands allow Basic program lines to be moved from one place to another and duplication of program lines. The RENUM (for renumbering a program) and REFERENCE (for getting a variable and line reference table) functions are also included.

TRON allows single stepping through a program; TROFF turns off the function. These may be inserted into a program to aid in its development. Another command, CMD "M" - variable map command, will display currently defined variables and their values. Used with TRON this is a very powerful feature.

CMD "SR" will Search and Replace anything in your program, such as changing all PRINT commands to LPRINT.

If the statement,

RUN "program name",V

is encountered in a Basic program, all currently defined variables will be saved for execution with the program being called and run.

Finally, Basic allows LPRINT TAB to a value of 255.

### DOS Commands and Features

As DOSPLUS claims in their advertisements, it operates very smooth and fast. "Overall", DOSPLUS is the fastest operating system I have seen.

Automatic lowercase keyboard detection is supported. This means that if you have a keyboard with lowercase capability, DOSPLUS will automatically detect it and support the lowercase within the DOS. Also, a block cursor and automatic key repeat is supported from powerup.

Keyswitch bounce from the earlier keyboards is eliminated with this DOS. The vendors claim that they have found a new routine for this which no one else uses, and guarantee that no TRS-80 keyboard, old or new, will ever have a keybounce problem with their DOS.

DOSPLUS also supports a screen print command. Anytime you want to print the information on the video to a printer, you may do so. And if the printer is

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not ready, control is returned to the keyboard. It will not hang up. Also, you are allowed to stop (BREAK) the screen print function at any time.

BUILD and DO commands allow you to make a file of command lines which, for example, from power up will load Basic, set memory size and number of file buffers, and then load and execute a Basic program.

The DIR and FREE commands are the most useful of any Model I system we have used. The FREE command, like the Model II and III, maps disk space availability, which tracks are locked out, and where the directory is located. The DIR gives you the usual information as well as free space in K (approximately 1000 bytes) and Grans. In the DIR routine, you have the option of pressing the space bar to scroll a file at a time or to press ENTER which will scroll up a full page. This is very useful when using a double density disk, as there are more programs and files on it. Of course, the output of either the directory or the free space map may be sent to the printer.

In addition to DIR and FREE, DOSPLUS also has a command called MAP. This powerful feature returns, among other information, the locations of each file, the beginning and ending location for each segment, and so on.

The PURGE command allows you to kill off unwanted files from a disk fast and efficiently. What is different about DOSPLUS is the RESTORE command. If you accidentally kill or purge a file, you can get it back by simply typing "RESTORE filespec". After you do this, the directory will show it has indeed been restored. An extra feature is "DIR (D)", which will show you all deleted files in the directory which is a real aid with the RESTORE command.

The TRANSFER command will copy your files from one diskette (single or double density) to another diskette. While it will not transfer system files, you may specify the invisible file (I) option to transfer those. It is also great for moving all of your single density files to a double density diskette or vice versa.

The FORMS command allows you to control the parameters of your printer. It allows for paper length in lines per page, number of printed lines per page, and number of characters to be printed on each line.

The FORCE command is like the ROUTE command supported by VTOS and Model III. It supports the devices, \*DO=video, \*PR=printer, \*KI=keyboard, and allows you to route whatever normally goes to your screen to your printer or vice versa.

The CONFIG option allows the system to be set for specific needs. The number of tracks, disk head stepping rate, number of sides, and high speed/reverse video if your system has it may be specified. Also the number of drives may be configured into your system.

Execute only protection for Basic programs is supported through the use of the DOS command ATTRIB. The program will now run, but it cannot be listed, edited or tampered with in any way without knowing the password you have assigned to it. The break key is also disabled but may be left enabled if wanted.

CLEAR allows the memory to be zeroed above

6000H. After this command is executed you may be sure of not having any unwanted data or garbage in memory.

CREATE allows you to create a file and preallocate space for that file. Preallocating file space will speed up file write time because the DOS does not have to periodically allocate more space on the diskette.

CLRFIL will clean a data file out without having to delete the file. Once a file is zeroed, however, the data cannot be recovered even with the RESTORE command.

BACKUP will work with either a single or multidrive system.

DATE and TIME may be called from DOS as well as Basic. You can also set it from Basic with the command, CMD"TIME 03:30:00".

The FORMAT command allows you to specify single or double density, the number of tracks and the rest of the information needed. There is a difference in the way this utility is executed as compared to other operating systems: The other DOS's will move the disk head all the way back to track 0 before verifying the disk. DOSPLUS starts at the last track formatted and works its way back to track 0. It appears to be faster. It certainly is more logical. Also, since most tracks which have a tendency to be bad are on the inside of the disk, this will locate them first. Very nice job!

DISKDUMP is not anything like Radio Shack's Diskdump. It allows you to display and modify a disk file or program. Once DISKDUMP is loaded, the disk head will be positioned at the beginning of the specified program. Then, with the aid of the repeating key capability, you can scan backwards or forwards through the file.

Included with DOSPLUS is a great program called DISKZAP. It allows you to specify how many tracks a disk has that you want to edit, display sectors, modify sectors, zero files, copy tracks, print tracks, verify and format disk, or even format just one track if you want. It is generally comparable to other programs of this type, but being able to work with single or double density makes it really nice.

### Summary

Yes, we are impressed with DOSPLUS and Micro Systems Software. They are a very new and fast moving company that has demonstrated a knowledge of what people need in systems software. Using DOSPLUS has been a pleasure especially without having to insert any fixes or patches to keep it working. There have been no bugs or errors attributable to this system. It is super fast, efficient, easy to understand, logical to use, and still offers most of the power and flexibility of the other DOS's.

What few shortcomings are limited to the lack of technical information in the manual (we understand this is being worked on), and the fact that some machine language programs will need patching to operate. But, you can still continue to use most of your favorite and proven Model I programs.

If you want a fast, reliable operating system, DOSPLUS 3.3D and 3.3 (single density) are highly recommended. ●

# DOSPLUS

## FEATURES:

- 1) Radio Shack compatibility
- 2) Error free variable length records
- 3) Full lower case detection and support
- 4) Repeating keyboard with NO keybounce EVER
- 5) Shift [O] typewriter keyboard option
- 6) Execute only protection feature for BASIC programs
- 7) Automatic track support for 35 through 80 track drives (mixed)
- 8) Device I/O handling with FORCE command
- 9) Supports high speed clock modification (up to 4.0mhz)
- 10) Supports mixed mode (single & double density) automatically
- 11) Allows disable-enable of break key
- 12) Allows user to define step rate per drive and re-configure system disk
- 13) Allows for efficient use of double-headed drives
- 14) Built in screen printer (shift [CLEAR]) with [BREAK] key abort
- 15) Multiple command chaining with "DO"
- 16) Built in memory test with CLEAR command
- 17) New printer driver which allows complete forms control and paging
- 18) Automatic serial printer driver with optional auto linefeed
- 19) Execute any DOS command from BASIC and return to BASIC
- 20) Free space map of diskette with optional output to printer
- 21) Copy with variable length files
- 22) Complete RS232 control from keyboard with status check
- 23) Create and pre-allocate files from DOS
- 24) Display current date and time from DOS
- 25) More information from Directory with optional printer output
- 26) Enter DEBUG with shift [BREAK] to allow use of [BREAK] from BASIC
- 27) New DISKDUMP/CMD sector display/modify program (works with filespecs)
- 28) New DISKZAP/CMD single/double density disk editor
- 29) New BACKUP (more reliable, no more pack ID check)
- 30) New FORMAT (more reliable, no need to bulk erase disk first)
- 31) New MAP utility (maps out disk, showing where files are located)

## New DOSPLUS Z80 Extended Disk BASIC

- 1) Faster loads and saves
- 2) BASIC Reference utility (lines, variables, keywords, printer option)
- 3) BASIC Renumber utility (renumber section of text, block text move)
- 4) Shorthand features for almost ANY direct command (LOAD, SAVE, etc.)
- 5) Shorthand features for editing (listing and editing with single key)
- 6) CMD "M" instantly displays currently set variables
- 7) Global search and replace in BASIC text
- 8) Line printer TAB to 255
- 9) OPEN "E" to end of sequential file (for output)
- 10) DI (delete and insert text line)
- 11) DU (duplicate text line)
- 12) "R" & "V" options after LOAD and RUN (files open & save variables)
- 13) OPEN "D" allowed (Model II compatible) equal to OPEN "R"
- 14) DOS commands from BASIC
- 15) Automatic, error-free variable length records
- 16) Single step execution with TRON (fabulous for debugging)
- 17) CRUNCH (BASIC program compressor)
- 18) New TBASIC (tiny BASIC) offers full BASIC commands
- 19) TBASIC and DOSPLUS together only use BK of RAM (40K left in 48K TRS-80)

### \*\*\*\*\* 7 MORE UTILITIES \*\*\*\*\*

- 1) Single drive copy
- 2) Restore (dead files)
- 3) Purge (unwanted files)
- 4) Clearfile (destroys data by writing zeros to file)
- 5) Transfer (moves all user files from one disk to another)
- 6) Spooler (allows printing of text while freeing up the CPU)
- 7) Crunch (Basic program compressor)

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**Master Directory 1.2 (double density) — \$29<sup>95</sup>**

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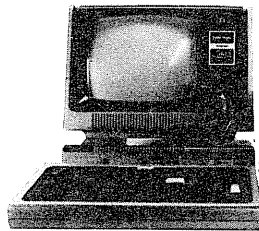
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# Descending Lower Case



Larry Panattoni

Lower case video and Model I may seem like an old subject, but I recently made an improvement to mine at a minor cost of \$19.95. Because more than half the Model I owners I know have not yet obtained the "official" Radio Shack lower case modification, I would like to share this latest improvement and discuss some additional possibilities.

The Model I was not designed for lower case letters but it is capable of providing them with a slight modification. During the early months of the Model I's introduction, a do-it-yourself modification (not approved by Radio Shack) was made popular by the introduction of the fine word processing program, the ELECTRIC PENCIL.

A great number of owners implemented this simple modification. It consisted of adding an eighth video memory chip for bit D6 (missing from the original design) and a toggle switch for switching back to the standard all upper case letters.

The demand for this word processing program and its modification caused Radio Shack to provide their own official versions: SCRIPSIT and the lower case modification.

## Lower Case Modifications Compared

There are pro's and con's regarding both the modifications. First we will explain the drawbacks of each, then show how we eliminated one of them in the do-it-yourself modification.

The Radio Shack modification received mainly two complaints, neither of which are substantial.

First, some older programs would not run properly with the modification installed. Even though we have a program that doesn't, we believe such to be few in number. If Radio Shack would have included a toggle switch, those would have been compatible. By now, all new commercial programs are compatible.

The second complaint was cost: \$99 originally, slightly less since it first came out. In response to this, labor plays a part and is expensive. In addition to the added memory chip, an excellent lower case driver is provided. And, you receive a new Video Character Generator (VCG) which allows the tails of some lower case letters descend below the base line, which the original VCG did not do.

The drawbacks to the do-it-yourself mod are several. First, it voids the warranty.

Second, you must provide your own lower case driver.

Third, the video display of some lower case letters looked odd because the original VCG did not allow the tails of the g, j, p, q and y to descend below the base line. See chart 1. Correcting this problem is the latest improvement to this to-it-yourself mod.

## The Video Character Generator

All characters except graphics are burned into a ROM which we have called the VCG. It is this VCG which Radio Shack replaces during their modification. My early attempts to purchase this VCG from Radio Shack proved futile. However, there recently appeared an outside source for a ROM which appears identical to theirs. It sells for \$19.95.

It is a popular notion that the VCG displays a 5 X 7 dot matrix character. This is only partly true. The actual output is a 6 X 8 matrix, with one column always blank to provide horizontal spacing between letters and one row blank for vertical spacing. See charts 1 and 2.

The Model I designers apparently felt the width of one dot was not enough between rows, so they used a hardware circuit to blank four additional rows between each of the sixteen lines of characters on the display. Of the five dot positions separating each row, only one is controlled by the VCG. It is this one horizontal blanking row which allows the improved lower case characters.

Chart 1 shows the complete set of characters which the original VCG is capable of displaying. The four blanking lines caused by the hardware circuit, as mentioned earlier, are not shown. Notice the first row and column are always blanked out. These are the horizontal and vertical rows which allow for horizontal and vertical character separation.

This configuration puts the base line of each character on the bottom row (eighth dot), allowing no room for descending letters which creates odd appearing g, j, p, q and y's on the screen.

Chart 2 shows the complete set of characters which the new VCG produces. The horizontal row used for vertical separation is now the bottom row, raising the base line by



one dot position. This allows descending characters.

While neither chart shows it, the video screen produces greater separation between dots vertically than horizontally. This gives the appearance of longer tails, resulting in a more pleasing display.

The new VCG also replaced the Greek characters (see chart 1) with a duplicate set of upper case characters. This is for software compatibility, attempting to eliminate the need for a toggle switch, and for switching back to the normal (all upper case) mode.

**Installing the new VCG**

The new VCG (priced at \$19.95) is available from E B Garcia & Associates, 203 North Wabash, Chicago, Illinois 60601. It comes complete with installation instructions, which consist of opening up the keyboard unit, locating the VCG (IC 29), removing it and installing the new one. Those of you with later models can do this without using a soldering iron because you will have an IC socket. The older keyboards will require desoldering the original VCG from the printed circuit board and resoldering the new one.

The instructions describe a safe and easy method of desoldering the VCG for those who are inexperienced at doing so. They suggest that you remove the soldered VCG by clipping each of its pins, then removing them one at a time with a low wattage iron. This ruins the original VCG, but does provide a neat removal job.

The original VCG can easily be removed intact by using a desoldering braid (available from Radio Shack stores). It is used to soak up and remove solder from each pin on both sides of the printed circuit board until the pin wiggles freely. Then simply remove the VCG by hand. This provides a spare VCG for future projects or experiments.

One thing which the instructions do not suggest is to solder an IC socket in the board first, then plug the new VCG into the socket. This allows swapping the new and old VCG's.

The greatest advantage to the do-it-yourself lower case mod is cost. All it takes is a 2102 memory chip and toggle switch (for about \$5) and the new VCG.

Those of you who have procrastinated all this time and now feel you want to install this mod can obtain a copy of the necessary hardware and software changes free by sending a self addressed, stamped envelope to me at 216 South 18th Street, Yakima, Washington 98902.

**Further Possibilities**

The first 32 characters of chart 1 contain characters which are not normally used. However, they are available to programmers with the do-it-yourself mod and can be placed on the screen by using the POKE command.

The Model III was designed to perform this and comes with a set of special graphic characters in the first 32 locations, as well as in other locations. These include card symbols, a pointing hand and other symbols.

This VCG can be molded to your own specifications in several ways. The 32 special characters can be replaced with your own set in an EPROM (Eraseable Programmable Read Only Memory). Even foreign language characters could be programmed, which would be useful for teaching.

The VCG could also be replaced with switchable RAM circuitry enabling you to program your own character set from the keyboard. This could then be saved to tape or disk.

But making these changes will leave you on your own, and required to make your own repairs.

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**Construction**



**CHART #1**

The above is the complete set of characters which the original Video Character Generator (VCG) of the

Model 1 is capable of producing when modified for lower-case (non-Radio Shack modification).



**CHART #2**

After having the Radio Shack lower-case modification installed, the new Video Character

Generator (VCG) is capable of producing the character set shown above.

**The Micro Clinic**  
**17375 Brookhurst # 114**  
**Fountain Valley, CA 92708**  
**\$24.95 + \$1 postage & handling**  
**Minimum 16K Model I with 1 Drive**  
**Floppy Doctor**  
**Memory Diagnostic**

Complete and specific diagnostic software is a must for anyone who wishes to insure long term reliability of their hardware. The Micro Clinic offers two programs on a single disk which are designed to seek out and identify those problems which may hamper the reliability of a computer system. They were created to find errors in two major problem areas of the TRS-80 Model I - the memory array and the disk controller and drives.

#### **The Floppy Doctor**

The Floppy Doctor is a machine language program for the diagnosis of any ailment that may befall your TRS80 and its disk drives. Aside from the program disk, the only thing necessary to run the utility on your computer is a formatted diskette for each drive to be tested.

The program disk contains its own loader and cannot be read by DOS software. To load the program, simply place the master diskette in drive 0 and depress the reset button. You will then be asked which program is to be run - Floppy Doctor or Memory Diagnostic. After selection, the appropriate program will load and in a few seconds will announce itself. The computer will ask you to specify the operating parameters for your drives. It will ask you which units are to be used (0-3), how many tracks (35 or 40), and the track-to-track access time (40 ms, 20 ms, 12 ms). If you are unsure about the specifications of your particular drives, the program documentation includes the data for disk drives such as Shugart/Radio Shack, MPI, Vista and Pertec. After defining the parameters, you must enter which tests are to be run (A through E, or S). Tests may be run in any order, but running any given test assumes that the tests prior to it will run without errors. Any test may be specified to run more than once. Next, the computer will ask if it is to terminate on the occurrence of excessive errors. This is provided as a means of escape from "endless loop" errors.

There are six separate tests in the diagnostic. These are:

Test A - checks the basic controller functions and status bits and also checks the function of mechanical components such as the track zero switch, the write-protect switch and the index pulse sensor.

Test B - verifies that data is being transferred from disk drive to the controller. It forces certain error conditions and also tests the drive seek function.

Test C - performs a single sector write/read. Data read back is then verified byte-by-byte to insure correct transfer to the CPU.

Test D - tests the write/read function across the entire diskette. It also checks cross-cylinder interference.

Test E - tests the write/read function across the entire diskette using all possible data patterns.

Test S - tests the accuracy of the drive motor speed. The allowable error is +/- 0.33%. Adjustments may be made on the drive while this test is in progress.

Three stepping rates are available so that drives may be tested at their full rated speed, and the read/write compatibility between drives can be checked. Any of the tests may be run continuously if desired, to check for long-term reliability. The error messages are very detailed and complete. Said messages are reported when errors or abnormal conditions are detected. Error totals for each drive are displayed at the end of each diagnostic test. Errors are reported by type, with track and sector information printed out in hexadecimal.

The errors which the Floppy Doctor checks for are:

Drive sensed ready when not selected, write protect not sensed, busy flag not sensed, drive not ready, index mark sensed when not expected, index mark not sensed, write protect sensed, controller exceeded time limits for operation, track register is not being updated, track zero not sensed correctly, data is not being transferred to the controller, forced record-not-found error did not occur, forced lost data error did not occur, failed multiple-sector I/O operation, data read from disk is incorrect, record not found, seek error, CRC error and lost data.

The possible causes for errors which are checked are:

Bad drive motor, bad stepper motor, bad index mark sensor, bad or misaligned switch, dirty or worn head, carriage binding, worn or missing head load pad, bad expansion

interface clock, defective or unformatted diskette, misaligned head, bad write/read board, bad expansion interface controller or interfacing circuits, out of tolerance drive motor speed, bad cables or dirty edge connectors, and (heaven forbid!) operator error.

This program provides a positive means to thoroughly check the disk controller circuits and drives, and to verify the reliability of a disk system.

#### **Memory Diagnostic**

The memory diagnostic half of the system diagnostic team is the least exciting but quite possibly the most useful. It consists of two routines which may be run either independently or together. The first routine is a write/read test which loads each memory address with every possible data pattern (a total of 2560) and also checks if data integrity is maintained over a given period of time. This same test checks to see if the addressing of any particular address alters the data contained in any other address. The second test is the "M-1 Worm" test. This test checks memory by attempting to execute a short (six byte) block of machine code from the memory under test. First, the entire test area is filled with hex FF. Then a special six-byte block of code is written into the first six locations and executed. If this works then the block is shifted up one address. This continues until it has "inched" its way through the entire memory, hence the name.

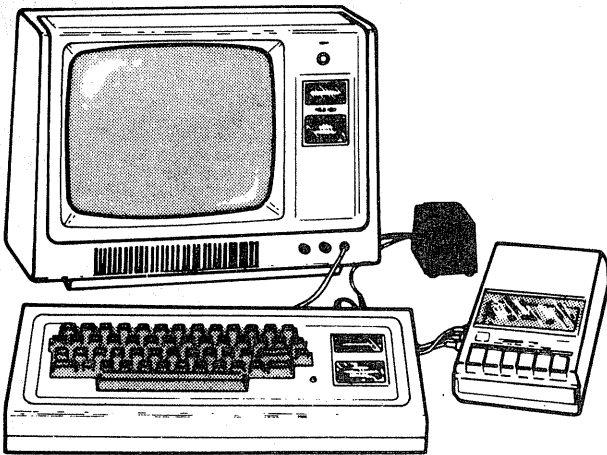
The amount of memory in your system determines the time each test will take to run. One pass of the test on a 48K machine, with the "Worm Test", will take about two hours. At the end of each complete pass, the total number of passes and the cumulative error count will be printed. The author of these programs recommends that the memory diagnostic be run a minimum of twelve hours, and that to really test the machine, at up to seventy-two hours at elevated temperatures.

#### **Conclusions**

These two programs are complete utilities which leave very little, if anything, to be desired. The documentation is clear and precise, and for all of the occasions during which human intervention (Ugh) is necessary, the inputs are made as fool-proof as possible. At the relatively low price of \$24.95, these programs are a must for any serious user of the TRS-80.

**W W Harper II**

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One of the most popular and useful of the utility packages, Utility II is the second in a series of programs designed to take the drudgery out of editing.

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Use these two programs as your dependable "assistants" to speed merging processes and as a totally reliable retrieval means in search and edit operations.

A fine tool for your TRS-80! (T1)

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## COMPRESSION UTILITY PACK

Do you want to add sound routines to a Space Trek program that already uses 16K? Or maybe you need an extra column in that financial report program, but when you run it, you get OM errors?

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can even fetch, decode, disassemble and analyze each instruction individually so that your program cannot bomb out.

ULTRA-MON is designed for the beginning machine-language programmer as well as the professional. The documentation contains a Simple Demonstration section geared to the novice programmer. Consequently, the program is a learning device as well as an extremely useful programming tool.

If you are serious about programming, you need to add this powerful utility to your library today. (T1)

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You've bought a super machine-code program, but now wonder how it works. Maybe you even used a quick PEEK routine to glance through it when it was in memory. If so, you definitely noticed the complete lack of comments in the code, making it almost impossible for you to decipher and understand it.

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TLDIS (Tape-based Labeling DISassembler) and DLDIS (Disk-based Labeling DISassembler) are three-pass, label-assigning disassemblers which assign labels (where appropriate) to the routines in a machine-language program. Their output is almost identical to that of a hand-assembled source code.

You can send the disassembly to a lineprinter (Radio Shack parallel port) for either TLDIS or DLDIS. (The difference between these utilities is the storage mode of the disassembly.)

TLDIS can send the disassembly to cassette tape, DLDIS can send it to disk; both send it to the video monitor. The stored disassembly from TLDIS may be reassembled with Radio Shack's EDTASMTM—the disassembly from DLDIS, with Apparat's extension of EDTASMTM. Because of the use of

labels, it is a simple matter to change any object code program by disassembling it and then making changes to the resultant source code, without losing track of jump/load addresses. Labels start with "AA00" and increment up, in even numbered steps (AA02, AA04, etc.). The odd numbers (AA01, AA03, etc.) are left for you to use for the source code during reassembly.

The printing of the disassembly may be temporarily halted by using [SHIFT] @ (just as in BASIC) or it may be ended by pressing the [BREAK] key. It also has a comments column to display ASCII characters used in a LD or CP opcode.

TLDIS and DLDIS may be relocated in memory to avoid conflict with the program you disassemble.

The next time you need to "climb inside" a machine-code program, take DLDIS or TLDIS with you. We promise that it will be an easier journey.

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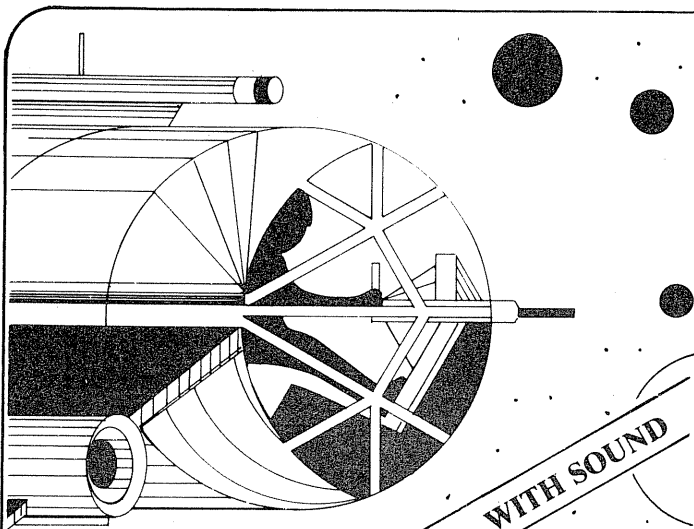
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- 1.3 In addition, alien ships can make in-

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1.4 You'll need lightning reflexes and nerves of steel to survive Asteroid. We have no use for non-survivors!

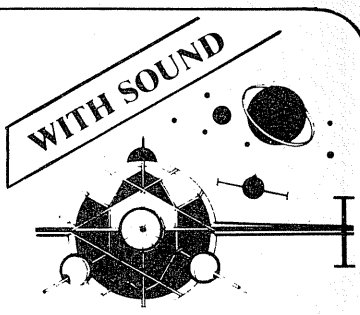
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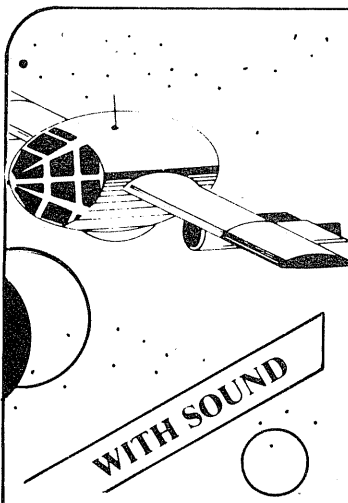
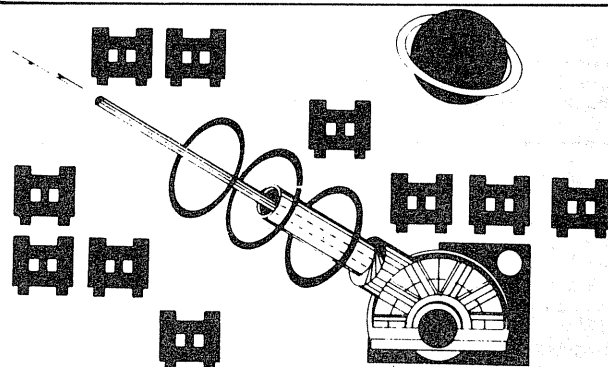
Imagine yourself at the control console of an LW-1417 Stratoblazer (Type B Strategic Laser Weapon). Your Hindsight Director informs you that a Gnat fighter is coming in for an attack. You pivot your gigawatt laser turret until you can see the target on your monitor. The Range Indicator shows him coming in fast. The Targeting Computer studies his course and speed as your finger tenses over the firing key. You know you'll have only a fraction of a second in which to react. The Gnat fighter's evasive maneuvers cause him to dance in your sights. Suddenly,



you see the FIRE Command and you react instinctively. Your laser beam lashes out and reduces the Gnat to an expanding ball of ionized gas. Mission accomplished!

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80-U.S. Journal Jul/Aug 1981

Circle 18

(T1) = TRS-80 Model 1, Level II, 16K RAM.

(T2) = TRS-80 Model 1, Level II 16K, Expansion Interface 16K + 1 disk drive.

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# OKIDATA is OK

The Microline 80 has been around for almost two years. It has been a little work-horse for many of us. In this "tongue-in-cheek" article, Ira McComic tells of his experiences with it.

Ira McComic  
Plano, Texas

The romance was fading. That passion generated by newness and undiscovered delights which had first brought us together was cooling with familiarity and the realization of limitations. It was time for something new in our relationship.

After a few months of game playing with my TRS-80 16K Level II, I was ready to start writing all those brilliant programs sitting up there in my head. But

1. Being of penny-pinching character (partly through heredity, but mostly due to environment), I think it has more features per buck than many other printers. It is less than \$700 for the standard model (and maybe way less if you shop around).

2. It is an impact printer and, compared to thermal, flogging beats burning for print quality. Even better, you can get multiple copies if you would like to run off

**"The problems were minor and were quickly solved."**



**To the left we have Jennifer McComic using her dad's new Microline 80.**

after the short ones were finished, I realized that a printer was going to be needed to develop the larger ones.

Searching for just-the-right printer, I ran across an ad for the Okidata Microline 80. After a little more checking, that's the one which was brought home and placed next to the TRS-80. Several features of the Microline 80 made it the choice:

an extra for Auntie Blossom. Multiple copy capability is also handy for word processing and forms printing.

3. You can get a variable number of characters per line: 80 per line for programs and word processing and 132 for those home budget forms.

4. It is a dot matrix (9 X 7), which allows you to print both upper and lower case characters. Again, that's



Japanese characters? A quick look at the manual confirmed the Microline 80 was capable of printing *katakana* characters.

Hmmmm.

Clearly, there were two choices: Learn to write programs in Japanese or figure out some way to get that printer to speak English. Since the first choice seemed too time consuming, the second was tried.

Looking the printer over more carefully than a mother counting a new baby's toes, no button was found that said, "Push here for English".

OK, as a last resort, let's see what the manual says. I looked through the small manual (less than 30 pages) but couldn't find any directions on how to proceed.

Now what was to be done? I was hoping at least to be able to print out a short recipe program to pacify my wife and help persuade her that this printer was a better investment than patio furniture.

With no particular ideas about what to do, I began flipping through the manual again. There were some interesting notes about what control characters to use to change character densities and the number of lines per inch and there was the usual ASCII character table. If you've seen one ASCII character table, you have seen them all, except this one showed you some otherwise non-printing codes that would produce graphic characters. But even more important for the moment, there was a small note at the bottom that read, "Shift S1 jamper (sic) plug to Side A, and S3 to Side A. (left column) (ASCII)"

That cryptic note seemed to imply that English or *katakana* characters were jumper selectable - and that certainly makes sense. Since the previous inspection of the printer established the jumpers were not on the outside of the printer, they must be on the inside. See, it doesn't take a mental Goliath to be a computer enthusiast (and there are quite a few personal acquaintances who would testify to that).

Quicker than you can say, "Which one of you kids took Daddy's screwdriver?", the hood was popped on the printer to see if the alleged S1 and S3 jumpers could be found. Sure enough, there they were, sitting on top of the circuit board behind the platen as smug as a crooked county judge. One of the jumpers had a shorting plug in the right place, but the other one was as naked as a ring finger in a singles bar.

I twisted a short piece of wire around the bare shorting pins, reached over to the TRS-80 and tapped in RUN.

"THIS IS A TEST.", leaped out on the printer in bold English.

For an ol' boy who's done his share of sinning, that had worked out alright. Now, let's really see what this baby's made of. I entered a short, five-line program (took me five minutes to get it right with the Level II keybounce problem - gotta get that fixed one of these days) and then typed LLIST.

The Okidata chattered away like a squirrel at a nut cracking bee and printed all the program lines. However, each line was printed on top of the other.

Back to the manual again. It said that if you want an automatic line feed after the printer receives a carriage return, slip the S4 shorting plug to Side B.

Fortunately, the lid was still off of the printer. But again, there was no shorting plug at all on either side B or side A of S4. After taking a few turns around the jumper pins on side B with some hookup wire and typing in LLIST again, each line printed out on its own property. Ah, that's better; a line feed with every carriage return, just like a promise with every politician.

I tried a few more experiments with the printer and finally, convinced that everything was working well enough to please even a mother-in-law, I fastened down the lid and leaned back with the comforting feeling I had made a wise selection.

I called Okidata the next day to ask about the missing jumper plugs. A representative there assured me that my printer was an unusual case, that the printers sold in the United States are jumpered for English. He promised to send me a couple of jumper plugs to replace the wires I had stuck on. He said he was aware of a number of printers which were being used with the TRS-80. He had heard no reports of any of the problems I had encountered in connecting the Microline 80 to my TRS-80.

The problems were minor and were quickly solved. I am pleased with the printer and think it will prove to be a good investment. It's really rekindled a new interest in my TRS-80. At this point, Okidata is OK. ●

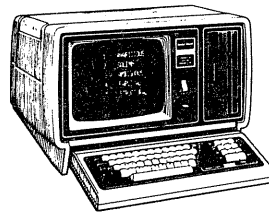
Okidata Microline 80 Printer Features

Print System	Impact dot matrix
Character composition	9 X 7 dot matrix
Printing speed	80 characters/sec @ 10 or 16.5 characters per inch. 40 characters/sec @ 5 characters/inch.
Maximum characters/line	80 characters/line @ 10 char/in. 40 characters/line @ 5 char/in. 132 characters/line @ 16.5 characters/inch.
Line spacing	6 or 8 lines per inch, software selectable.
Character types	64 alphanumeric characters and symbols. 32 lower case English characters characters and symbols. 64 kana characters and symbols 64 graphics symbols
Interface	Centronics-type parallel, standard. RS-232 is optional
Paper feed	Friction/fixed pins @ 9" centers standard. Adjustable tractor feed optional
Dimensions	13.46" wide, 9.65" deep, 4.25" high.
Weight	14.3 lbs without paper (approx)

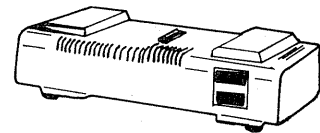
Table 1. Microline 80 Printer Specifications



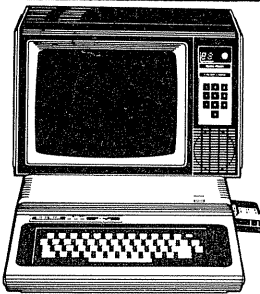
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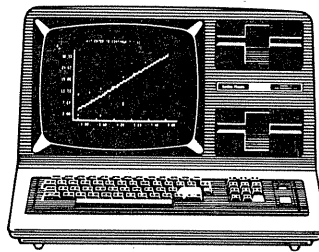
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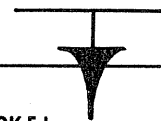


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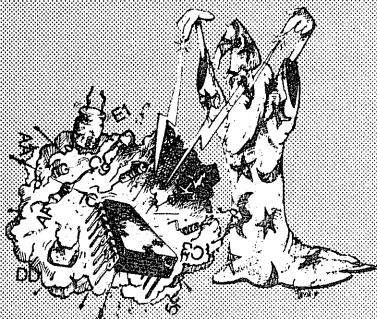
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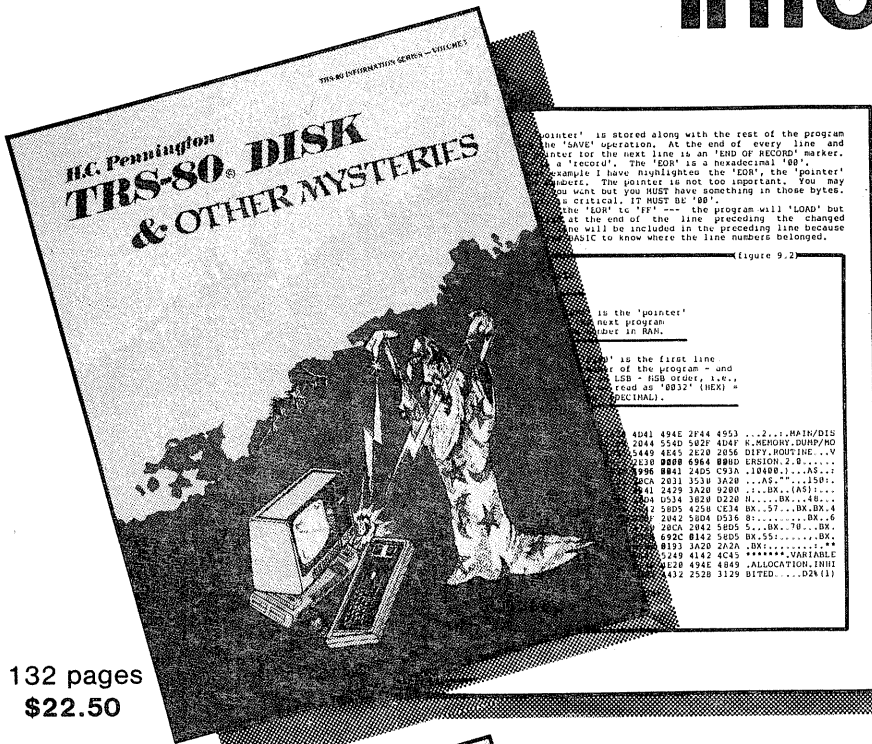
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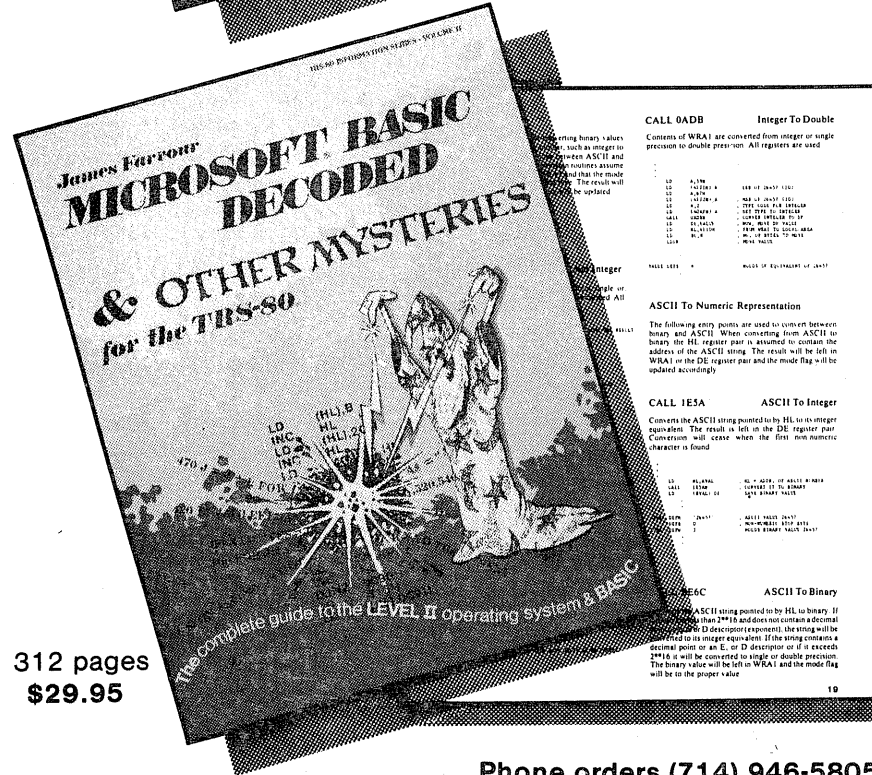
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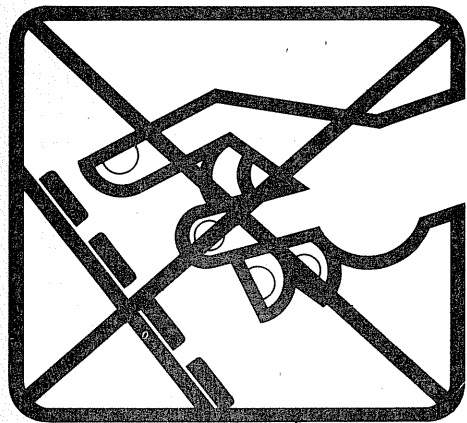
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Sometimes I wonder if I should retitl this column, "Fancy Things You Can Do with the TRS-80 Keyboard." You'd think everything has been said on that subject by now, though. But consider the fact that almost everything that the TRS-80 does results from something that someone, somewhere, typed in on a keyboard. In that light, a keyboard interface can have a universal and far-reaching effect. So if none of you are tired of keyboard routines, I'm not either. And here is yet another one.

The impetus for this routine (PRKEY, for Model I only) is the fact that you can do nearly anything from the keyboard, but not from a Basic program. A Basic program, for example, can't modify itself. (Not that that's always such a good idea, but there are times it would be nice.) PRKEY removes those limitations by allowing you to PRINT things you would otherwise type in by hand, and to interpret the printed material as keyboard input. You could, for example, print a series of DATA statements whose values depend on computational results. When the program terminates and user input is expected, these DATA statements will be entered into the program. (See Example 1.) This can be handy for setting up arrays for functions like SIN and COS which take a while to compute. You could also use PRKEY in conjunction with the INPUT statement to prompt the user with the default value of an input variable. He could backspace and change it or hit ENTER to accept it. (Example 2).

PRKEY works with the display and keyboard drivers and uses a circular (wraparound) buffer. Characters printed following a CHR\$(1) and terminated with either a CHR\$(0), a carriage return, or a computer request for keyboard input, are entered into the buffer and not displayed. Subsequent calls to the keyboard cause these characters to be removed one

at a time from the buffer and returned, until the buffer is empty or until the BREAK key is struck. To the computer, it looks as if the characters were entered from the keyboard. There is one restriction, however. The routine only works for line input, that is, input prompted by the X, ?, etc. It was not designed for use with INKEY\$. The reason is that some method must be used to tell whether the computer really wants a character or whether it's just looking for a BREAK or SHIFT@. Unfortunately, the keyboard driver is called for both purposes (in my mind a shocking oversight on the part of the Level II authors). With unrestricted use, BREAK key checking alone could empty the buffer completely.

By limiting use to line input, a hook in Level II RAM can be used to flag a legitimate keyboard call. This hook is at address 41AF and contains either a RET or a JP into DOS. It is called just before the computer requests a line of input. By putting a JP here to some code in PRKEY, we can set a flag saying it's okay to send characters out of the buffer. At the next carriage return, this flag is reset.

PRKEY is divided into four main sections: 1) The START block, which does the linking, 2) PRINT which directs printed output to either the screen or the keyboard buffer, 3) KEYBUF, which flags imminent line input, and 4) KEYBD, which transmits characters from either the buffer or the keyboard.

To use PRKEY, key it as shown into EDTASM, make an object tape or file, and load it via SYSTEM or from disk. (Don't forget to set memory size equal to your origin.) Execute the START block, and you're ready to go. PRKEY is a program that invites experimenting. Just be sure to use an expendable disk, though, because you might PRINT a command you don't want and won't be fast enough to stop.

```

7E45          00090          ORG          07E45H          ;OR OBE45H OR OFE45H
7E45 2A1640   00100 START LD          HL,(4016H)      ;LINK IN KEYBOARD
7E48 22DB7E   00110          LD          (REGKEY+1),HL ;
7E4B 21B37E   00120          LD          HL,KEYBD      ;
7E4E 221640   00130          LD          (4016H),HL   ;
7E51 2A1E40   00140          LD          HL,(401EH)   ;LINK IN DISPLAY
7E54 22A27E   00150          LD          (OLDPR+1),HL ;
7E57 21777E   00160          LD          HL,PRINT     ;
7E5A 221E40   00170          LD          (401EH),HL   ;
7E5D 3AAF41   00180          LD          A,(41AFH)    ;XFER BUFF'D INPUT HOOK
7E60 32B07E   00190          LD          (KLINK),A    ;
7E63 2AB041   00200          LD          HL,(41B0H)   ;
7E66 22B17E   00210          LD          (KLINK+1),HL ;
7E69 3EC3     00220          LD          A,0C3H      ;REPLACE W/ JP KEYBUF
7E6B 32AF41   00230          LD          (41AFH),A    ;
7E6E 21A87E   00240          LD          HL,KEYBUF    ;
7E71 22B041   00250          LD          (41B0H),HL   ;
7E74 C3CC06   00260          JP          06CCH       ;OR JP 402DH FOR DOS
7E77 3AF97E   00270 PRINT LD          A,(MODE)    ;GOES IN BUFFER?
7E7A B7       00280          OR          A           ;
7E7B 2821     00290          JR          Z,REGPR     ; NO: DISPLAY
7E7D 79       00300          LD          A,C         ; YES: ALL DONE?
7E7E B7       00310          OR          A           ;
7E7F 2823     00320          JR          Z,NEWMD     ; YES: RESET MODE
7E81 2AFD7E   00330          LD          HL,(BUFPP)   ; NO: GET BUFFER PTR
7E84 71       00340          LD          (HL),C      ;PUT CHAR IN BUFFER
7E85 E5       00350          PUSH       HL          ;SAVE OLD PTR
7E86 CDEF7E   00360          CALL      INCHL        ;INC PTR
7E89 22FD7E   00362          LD          (BUFPP),HL   ;AND SAVE
7E8C ED5FB7E  00370          LD          DE,(BUFPI)   ;GET KEYBD PTR
7E90 DF       00380          RST       18H         ;BUFPP=BUFPI?
7E91 E1       00390          POP        HL          ;(RESTORE OLD BUFPP)
7E92 2003     00400          JR          NZ,HLOK     ; NO: BUFFER NOT FULL
7E94 22FD7E   00410          LD          (BUFPP),HL   ; YES: FULL; RESAVE OLD BUFPP
7E97 79       00420 HLOK LD          A,C         ;A CARRIAGE RETURN?
7E98 FE0D     00422          CP         13         ;
7E9A C0       00424          RET        NZ         ; NO: STILL BUFFERING
7E9B AF       00426          XOR        A          ; YES: DONE BUFFERING
7E9C 1806     00428          JR          NEWMD      ;
7E9E 79       00430 REGPR LD          A,C         ;START BUFFERING?
7E9F FE01     00440          CP         1          ;
7EA1 C20000   00450 OLDPR JP          NZ,$-$     ; NO: JUST DISPLAY
7EA4 32F97E   00460 NEWMD LD          (MODE),A    ; YES: SET MODE
7EA7 C9       00470          RET        AND THAT'S ALL
7EA8 AF       00480 KEYBUF XOR        A          ;TERMINATE BUFFERING
7EA9 32F97E   00490          LD          (MODE),A    ;
7EAC 3C       00500          INC        A          ;FLAG BUFFERED INPUT
7EAD 32FA7E   00510          LD          (KMODE),A   ;
7EB0 C9       00520 KLINK RET        AND RETURN
0002          00530          DEFS     2            ;ROOM FOR ADDR IF RET IS JP
7EB3 3AFA7E   00540 KEYBD LD          A,(KMODE)   ;BUFFERED INPUT?
7EB6 B7       00550          OR          A          ;
7EB7 2821     00560          JR          Z,REGKEY    ; NO: CALL FROM SOMEWHERE ELSE
7EB9 2AFB7E   00570          LD          HL,(BUFPI)   ;GET INPUT PTR
7EBC ED5BFD7E 00580          LD          DE,(BUFPP)   ;AND PRINT PTR

```

```

7EC0 DF      00590      RST      18H      ;ARE THEY THE SAME?
7EC1 280A    00600      JR        Z,EMPTY ; YES: BUFFER IS EMPTY
7EC3 4E      00610      LD        C,(HL)  ; NO: GET NEXT CHAR
7EC4 CDEF7E  00620      CALL     INCHL   ;INC PTR
7EC7 22FB7E  00622      LD        (BUFPI),HL ;AND SAVE
7ECA 79      00630      LD        A,C    ;GET CHAR IN A
7ECB 1803    00640      JR        CRCHEK ;CHECK FOR CARRIAGE RET
7ECD CDDA7E  00650  EMPTY  CALL     REGKEY  ;CALL KEYBOARD
7ED0 FE0D    00660  CRCHEK CP        13    ;A CR?
7ED2 C0      00670      RET      NZ     ; NO: NORMAL RETURN
7ED3 4F      00680      LD        C,A    ; YES: SAVE IT
7ED4 AF      00690      XOR      A      ;END OF BUFFERED INPUT
7ED5 32FA7E  00700      LD        (KMODE),A ;
7ED8 79      00710      LD        A,C    ;GET CR BACK
7ED9 C9      00720      RET      ;AND RETURN
7EDA CD0000  00730  REGKEY CALL     $-$    ;CALL KEYBOARD
7EDD FE01    00740      CP        1      ;BREAK KEY HIT?
7EDF C0      00750      RET      NZ     ; NO: OKAY
7EE0 2AFB7E  00760      LD        HL,(BUFPI) ; YES: EMPTY BUFFER
7EE3 22FD7E  00770      LD        (BUFPP),HL ;
7EE6 AF      00780      XOR      A      ;TERMINATE BUFFERED INPUT
7EE7 32F97E  00790      LD        (MODE),A ;
7EEA 32FA7E  00800      LD        (KMODE),A ;
7EED 3C      00810      INC      A      ;GET BREAK BACK
7EEE C9      00820      RET      ;AND RETURN
7EEF 23      00830  INCHL  INC      HL    ;INCREMENT POINTER
7EF0 11FF7F  00840      LD        DE,BUFEND ;PAST END OF BUFFER?
7EF3 DF      00850      RST      18H   ;
7EF4 C0      00860      RET      NZ     ; NO: OKAY
7EF5 21FF7E  00870      LD        HL,BUFFER ; YES: LOOP BACK TO START
7EF8 C9      00880      RET      ;AND RETURN
7EF9 00      00882  MODE   DEFB    0   ;DISPLAY MODE
7EFA 00      00884  KMODE  DEFB    0   ;INPUT MODE
7EFB FF7E    00890  BUFPI  DEFW    BUFFER ;INPUT BUFFER PTR
7EFD FF7E    00900  BUFPP  DEFW    BUFFER ;DISPLAY BUFFER PTR
0100          00910  BUFFER DEFS    256  ;BUFFER (ANY SIZE OKAY)
7FFF          00920  BUFEND EQU     $   ;END OF BUFFER
7E45          00930      END     START  ;AUTOSTARTS @ START
00000 TOTAL ERRORS

```

```

BUFEND 7FFF 00920 00840
BUFFER 7EFF 00910 00870 00890 00900
BUFPI 7EFB 00890 00370 00570 00622 00760
BUFPP 7EFD 00900 00330 00362 00410 00580 00770
CRCHEK 7ED0 00660 00640
EMPTY 7ECD 00650 00600
.HLOK 7E97 00420 00400
INCHL 7EEF 00830 00360 00620
KEYBD 7EB3 00540 00120
KEYBUF 7EA8 00480 00240
KLINK 7EB0 00520 00190 00210
KMODE 7EFA 00884 00510 00540 00700 00800
MODE 7EF9 00882 00270 00460 00490 00790
NEWMD 7EA4 00460 00320 00428

```

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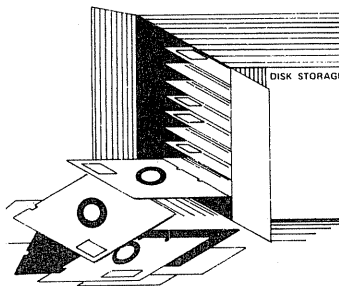
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```
OLDPR 7EA1 00450 00150
PRINT 7E77 00270 00160
REGKEY 7EDA 00730 00110 00560 00650
REGPR 7E9E 00430 00290
START 7E45 00100 00930
```

```
10 PRINT CHR$(1);"100 DATA";
20 FOR I=0 TO 15
30 PRINT SIN(I*6.2831854/16);";";
40 NEXT
50 PRINT CHR$(8):REM THIS BACKSPACE
REMOVES THE LAST COMMA.
```

Example 1

How to create a 16-value DATA statement from a Basic Program.

```
250 PRINT CHR$(1);A;CHR$(0)
260 INPUT "WHAT IS THE AMOUNT";A
```

Example 2

A section of code in which the current value of A is assumed as input unless the user backspaces over it and types something else.

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# "Basic Interactions"

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R C Bahn

### Introduction

The Basic language primarily recognizes two types of variables. These are called numerical variables and strings. The name of a string variable is recognized by the presence of a dollar sign (\$) as the last character of the name. In Level II Basic, string variables are composed of characters which may be numerals (0-9), alphabetical characters (A-Z), special symbols or graphics characters. String variables are delimited or identified by a preceding and following double quote (") sign. Thus in Basic one could type:

```
30 A$="THIS IS A STRING"
40 PRINT A$
RUN
```

Line 30 defines the string called A\$. Line 40 displays A\$ on the video screen.

Within the computer's memory only numbers are stored. Consequently, a numerical code must be used to represent the individual characters of a string. This code is very important for the storage of strings in memory, for the transmission and storage of string characters to tape and disk files, for the transmission and display of string characters on the video screen or line printer, for the storage of string variables within Basic programs as DATA.

The ASCII Code is the code which is most widely accepted in the computer industry for the processing of strings. ASCII stands for the American Standard Code for Information Interchange. The manner in which the TRS-80 implements this code is outlined in your Basic Reference Manual. Specifically, in the Level II Basic Reference Manual (Second Edition) it appears on pages C/1 to C/6. In general, for the TRS-80 Model I, the code extends from 0 to 191. Numbers 0 to 31 are control codes; numbers 32 to 95 are the standard upper case keyboard display characters; numbers 96 to 127 are the lower case counterparts; numbers 128 to 191 are graphics characters; numbers 192 to 255 are space compression codes, which are not relevant to our present discussion.

### Operations with Strings

This topic is sufficiently large to be the subject of several exercises and will only be briefly outlined. These descriptions plus the text of the reference manual, should provide sufficient information for the purposes of the following interactive program.

In addition to six bytes of storage for name, length and address of a string variable, each character of a string variable occupies 1 byte of memory, thus the first consideration in the processing of strings is memory management. One may reserve space for the characters of string variables by the CLEAR N statement, where N is the number of bytes reserved

for string storage. When not specified, 50 bytes of memory are routinely reserved for string storage. The amount of memory available for string storage can be ascertained by the FRE(A\$) statement. A\$ is a dummy argument.

String variables may be assembled by the addition or concatenation process. The expression C\$=A\$+B\$ appends the string B\$ to the end of A\$ and stores the result in C\$. RUN the following program:

```
60 A$="A":B$="B":C$=A$+B$:PRINTC$
```

FIGURE 1

```
10 REM***** INITIALIZATION *****
*****
20 CLEAR 500
30 C$="### %"
40 REM***** MENU ROUTINE *****
*****
50 CLS:INPUT"KEYBOARD ROUTINE(1),OR ASCII CODE(2)--PRESS ENTER";Z$
60 IF Z$="2" THEN 150
70 REM***** KEYBOARD ROUTINE *****
*****
80 CLS
90 PRINT" DEMONSTRATION OF INPUT OF ASCII CHARACTERS FROM THE KEYBOARD"
100 PRINT:PRINT:PRINT"PRESS ANY KEY,ESCAPE IS THE PERCENT SIGN(%)"
110 A$=INKEY$:IF A$="" THEN 110
120 IF A$="%" THEN 50
130 PRINT"A$=";A$,"ASC(A$)=";ASC(A$),"VAL(A$)=";VAL(A$)
140 GOTO 110
150 REM ***** ASCII ROUTINE *****
*****
160 CLS
170 INPUT"ENTER BEGINNING CODE NUMBER";A
180 IF A<32 OR A>128 THEN 170
190 N=0
200 FOR I=A TO A+63
210 N=N+1
220 PRINT USING C$;I,CHR$(I);
230 IF N<57 AND N=INT(N/8)*8 THEN PRINT

240 NEXT I
250 INPUT"TO CONTINUE,PRESS ENTER";Z$
260 GOTO 50
270 END
```



String variables may be automatically assembled by the STRING\$(N,C) statement where N is the length of the string and C is the character. RUN the following program:

```
150 A$=STRING$(32,"*"):PRINT A$
```

Several modes of representation of data can be encountered in computer processing. The programmer may want to convert a character from a decimal to a character representation. This is accomplished by the STR\$(A) statement, where A is the decimal number. The inverse process or character to decimal conversion is accomplished by the VAL(A\$) statement, where A\$ is the string representation.

Conversion from a character representation to the ASCII Code is accomplished by the ASC(A\$) statement, where A\$ is a single character string. The inverse process or ASCII to character conversion, is accomplished by the CHR\$(A) statement, where A is the ASCII code number.

String variables may be disassembled or analyzed by: 1) the LEFT\$(A\$,N) statement, where A\$ is the name of the string and N is the number of characters starting on the left which are to be returned; 2) the RIGHT\$(A\$,N) statement, where A\$ is the name of the string and N is the number of characters starting on the right which are to be returned; 3) the MID\$(A\$,N,L) statement, where A\$ is the name of the string, N is the sequence number of the starting character and L is the length of the string to be returned.

The length or number of characters of a string may be ascertained by use of the LEN(A\$) statement, where A\$ is the name of the string. The maximum length of a string variable in Level II and Disk Basic is 255 characters. However, problems with tape files will arise if the length of a string variable is greater than about 240 characters. It is a good practice in any application involving long strings to first carefully read the reference manuals and then to thoroughly test the algorithm before committing large amounts of data to the program.

In Disk Basic, the starting position of the first occurrence of a substring in a target string is returned by the INSTR(N,A\$,B\$) statement. N specifies a position in the target string where the search is to begin. A\$ is the name of the target string. B\$ is the name of the substring.

Also in Disk Basic, any part of a string may be replaced with a specified substring by the use of the MID\$(A\$,N1,N2)=B\$ statement. A\$ is the name of the target string to be changed. B\$ is the name of the replacement string. N1 specifies the starting position in A\$ for the replacement. N2 specifies the number of characters to be replaced.

The INKEY\$ statement causes the computer to strobe the keyboard and return a one-character string corresponding to the key pressed during the

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## ALL COMMANDS DIRECTLY SUPPORTED BY ZBASIC

FOR	NEXT	STEP	IF	THEN	ELSE	PEEK
SET	RESET	POINT	CHRS	RANDOM	RND	POKE
DATA	READ	RESTORE	END	GOTO	GOSUB	CLS
INPUT	INKEYS	LET	STOP	OUT	INP	RETURN
PRINT	LPRINT	PRINT@	USR	SGN	INT	ABS
SQR	LEN	ASC	VAL	STR\$	POS	ON GOTO
ON GOSUB	REM	NOT	AND	OR		

INTEGER MATH \*MULTIPLY /DIVIDE †ADD -SUBTRACT ‡← 32767  
NOTE Some commands do not act exactly as BASIC commands act

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strobe. The null string ("" ) is assumed if no key is depressed.

**Interactive Program**

The interactive program listed in Figure 1 consists of an initialization module, a menu module, a keyboard module and an ASCII code module.

The keyboard module enables one to study the symbols generated by the keyboard when a string variable is expected by the program. Following the symbol, the corresponding ASCII code associated with the symbol is printed on the video screen. If the symbol is a numeral, its decimal value is also printed. Try all possible keyboard entries, both upper and lower case. Note that if there is no lower case modification in your computer, only upper case alphabetical symbols will be printed on the video screen, but the proper ASCII codes will be generated.

The ASCII code module in Figure 2 allows one to more efficiently examine 64 consecutive symbols. Three passes through this module of the program will display the entire code. Three entry points which would accomplish this are 32, 63 and 128.

Compare the results of your keyboard exploration with the results displayed by the ASCII routine. In addition to the upper-lower case disparity, several other keys generate non-standard responses. Can you find them?

LINE	COMMENT
10-30	Initialization module.
20	Clear memory and reserve 500 bytes of memory for string variables and constants.
30	C\$ is format for the PRINT USING statement in line 220. It consists of eight spaces. The number signs (#) reserve a maximum of three spaces for a numeral. The percent signs (%) reserve a maximum of two spaces for a string.
40-60	Menu module.
50	Clear screen, print the menu prompt. The keyboard entry is a string variable called Z\$.
60	If Z\$ equals the string constant "2" the program will branch to line 150.
70-140	Keyboard routine.
90-100	Print header and instructions.
119	Keyboard scan routine.
120	Escape routine; if the percent sign (%) is pressed the program will return to the menu at line 50.
130	Print labels and symbols returned by various string processing statements. The character depressed at the keyboard will be printed as A\$. Next, the ASCII code returned from the keyboard appears. Note the characters which on the TRS-80 keyboard do not correspond to the ASCII standard. (See text). Finally, if the keyboard input is a numeral, the decimal value of the number will be printed. It will be indistinguishable from A\$ on the video screen. If the keyboard input is not a numeral, a zero will be printed on the screen.

- 140 Loop to line 110 for next keyboard input.
- 150-270 ASCII routine.
- 160-170 Clear screen and print the input prompt. The keyboard entry is the numerical variable A.
- 180 If the numerical input is not 32-128, repeat the input prompt.
- 190 Initialize the screen symbol counter N.
- 200 Initialize a FOR..NEXT loop to run from the input number to the input number plus 63. This amounts to 64 values.
- 210 Increment the symbol counter N.
- 220 Print the index number (I) which is the ASCII code number and the symbol which it represents (CHR\$(I)).
- 230 If the number of symbols printed is less than 57 (seven lines) and the number of symbols is exactly divisible by 8, then print a blank line.
- 240 End of loop.
- 250 Hold the screen for inspection.
- 260 Return to the menu.

Figure 2

```

100 CLEAR 3000
105 CLS
110 B$="### %%"
120 INPUT"ENTER BEGINNING ASCII CODE";B$
130 EN=BE+63
140 N=0
150 FOR I=BE TO EN
160 N=N+1
170 A$=CHR$(I)
180 PRINT USING B$;I;A$;
190 IFN<57 AND N=8*(INT(N/8)) THEN PRINT
200 NEXT I
210 GOSUB 2000
220 GOTO 105
2000 REM***** SCREEN HOLD SUBROUTINE WITH PRINTER OPTION***
2010 Z$=INKEY$:IF Z$="" THEN 2010
2020 IF Z$="P" THEN 2500
2030 RETURN
2500 N=0
2505 A$=""
2510 FOR I=15360 TO 16383
2520 N=N+1
2530 Q=PEEK(I)
2540 IF Q<32 THEN Q=Q+64
2550 IF Q=34 THEN Q=191
2555 IF Q>127 THEN Q=Q-64
2560 A$=A$+CHR$(Q)
2570 IF N<> 64*(INT(N/64)) THEN 2600
2580 LPRINT A$
2590 A$=""
2600 NEXT I
2650 RETURN
    
```

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Figure 3

In the following program  
the ^ symbol stands for the up-arrow.

```

10 REM***** SUMMARY OF ASCII CODE TE
   XT DEMONSTRATIONS ****
20 CLEAR 500:CLS
30 A$="THIS IS A STRING"
40 PRINT"A$=";A$
50 GOSUB 300
60 A$="A"
70 B$="B"
80 C$=A$+B$
90 PRINT"CONCATENATION"
100 PRINT"A$=", "B$=", "C$=A$+B$"
110 PRINT A$,B$,C$
120 GOSUB 300
130 PRINT"FREE STRING SPACE=";FRE(A$)
140 GOSUB 300
150 A$=STRING$(25,"*")
160 PRINT"A$=STRING$(25,'*')", "A$=";A$
170 PRINT"LEN(A$)=";LEN(A$), "FREE STRIN
   G SPACE=";FRE(A$)
180 GOSUB 300
190 PRINT"ARROW SYMBOLS"
200 PRINT CHR$(91),CHR$(92),CHR$(93),CH
   R$(94)
210 GOSUB 300
220 PRINT"DEMONSTRATION OF SINGLE CELL
   GRAPHICS CHARACTERS"
240 PRINT "ASCII CODES", "INCREMENT(K)",
   "PLACEMENT OF SINGLE CELL"
250 FOR I=0 TO 5
260 K=2^I
270 L=128+K
275 IF K=1 THEN K$="UPPER LEFT" ELSE IF
   K=2 THEN K$="UPPER RIGHT" ELSE IF K=
   4 THEN K$="MID-LEFT" ELSE IF K=8 THEN
   K$="MID-RIGHT" ELSE IF K=16 THEN K$=
   "LOWER LEFT" ELSE IF K=32 THEN K$="LO
   WER RIGHT"
280 PRINT"191,";L;"191",K,K$, CHR$(191
   );CHR$(L);CHR$(191):PRINT
290 NEXT I:END
300 REM***** SCREEN HOLD ROUTINE ***
   ***
310 INPUT"TO PROCEED,PRESS ENTER";Z$
320 RETURN

```

### Discussion

The keyboard of the TRS-80 Model I and III contain several keys which do not return standard ASCII values. These are the left arrow, the right arrow, the down arrow and the "shift@" keys. On the TRS-80 keyboard, these keys perform various control functions. The control functions comprise ASCII codes 0-31.

Despite being unable to obtain the three arrow characters directly from the keyboard, all arrow characters will be printed on the video screen or printer by designating the proper ASCII code. (This is true for the Model I, the Model III prints standard ASCII characters.) RUN the following program:

```
200 PRINTCHR$(91),CHR$(92),CHR$(93),CHR$(94)
```

Finally, it is important for you to know about the ASCII code to increase your understanding of the manner in which your data is stored and transferred, and to understand the peculiarities of the keyboard.

You may use the ASCII code representation of a character whenever the Basic statement requires such a designation. For example, PRINT "A" and PRINT CHR\$(65) are equivalent. So also are PRINT STRING\$(63,"A") and PRINT STRING\$(63,CHR\$(65))

You can avoid your actual use of the ASCII code in most programming except manipulation of graphics blocks. As you know, in the character mode the TRS-80 screen consists of sixteen line of 64 characters for a total of 1024 regions or blocks. These are indexed from the upper left hand corner of the screen to the lower right hand corner and are numbered 0 to 1023. These indices are used in the PRINT@ statement.

Each of these character blocks can be subdivided into six smaller cells of three rows and two columns. The ASCII code for the graphics characters (128-191) represents all the on-off combinations of the six cells. Including all off, there are 64 (or 2 raised to the sixth power) such combinations. ASCII code 128 represents the blanked cell. To turn on a particular cell, one adds the appropriate power of 2 to 128. The increment for the upper left cell is 1, for the upper right cell is 2, for the mid left cell is 4, for the mid right cell is 8, for the lower left cell is 16 and for the lower right cell is 32. The graphics character code for all the cells turned ON is (128+1+2+4+8+16+32)=191.

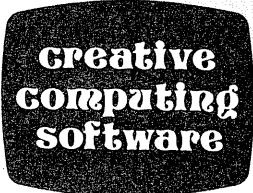
To generate all the single cell graphics characters RUN the following program:

```
250 FOR I=0 TO 5:K=2^I:L=128+K: PRINT
CHR$(191);CHR$(L);CHR$(191),L: NEXT I
```

The program generates the appropriate powers of two in K, computes the ASCII code in L and prints the character between two blocks of CHR\$(191) which allows one to appreciate the horizontal and vertical placement of the graphics cell. This program and other demonstrations referred to in the text, are listed in a separate program, Figure 3. The most important line is 275, which lists the rules for the graphics codes.

# TRS-80

# sensational software

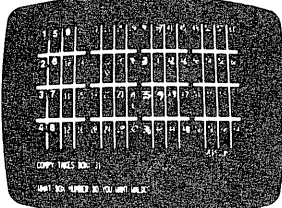


## Board Games

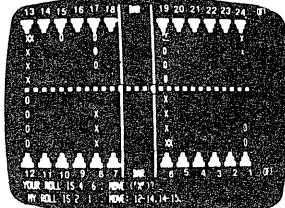
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6 Programs

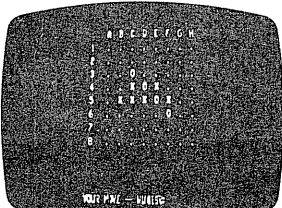
Requires 8K



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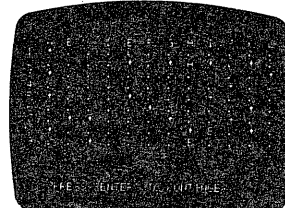
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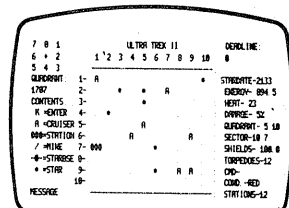
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4 Programs

Requires 8K



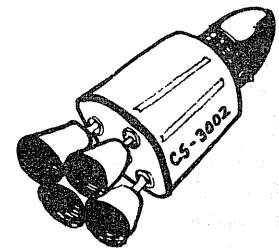
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**Star Wars.** Line up the TIE fighters in your sights and zap them. It's not easy.

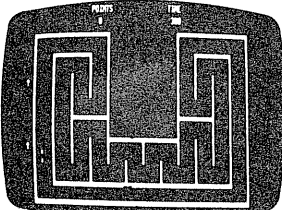


## Pursuit Games

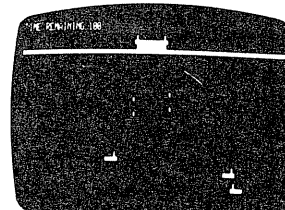
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5 Programs

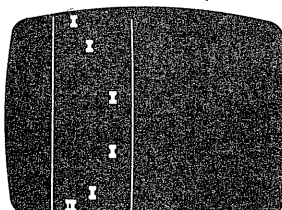
Requires 16K



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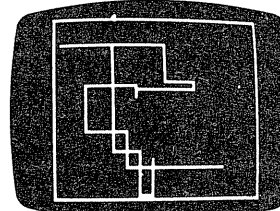
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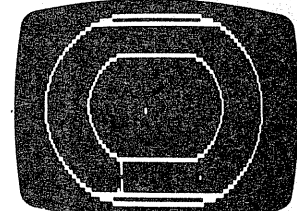
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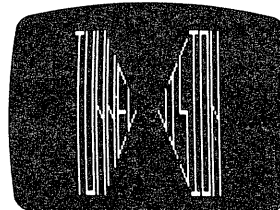
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## creative computing software

# TAPE Without Tears

For Model I or III

Spencer Hall

With the TRS-80, Radio Shack has brought the endless fascination and challenge of personal computing within the financial reach of more people than any other company. For this, countless thousands of us all over the world thank them. Unfortunately, by the same token, we don't thank them for the endless hours of torment and frustration they also gave us with their tape system. For most of us, those countless hours of fiddling with the tiny and almost unreadable volume control dial have sadly diluted our pleasure in using what has to be the ultimate toy of "homo sapiens". Early on, most TRS-80 owners start dreaming of a better program/data storage and retrieval system. There is disk of course. ("You *don't* have disk?", "You've *got* to have disk, it's the only way to go!") There is also the incredible Exatron Stringy Floppy.

But hold on a minute. Suppose your means are modest and your 16K Level II system represented just all the big bucks you could spare for a long time? Or suppose that you have other high priority items, like 32K more RAM, which you can get today for under \$200. And who doesn't want a line printer? They seem to be getting cheaper all the time. Nice if you could live with tape and save those bucks for other things, right?

In this article I propose to share the things I have learned about making the tape system easier, more reliable and generally more pleasant to use. I can truthfully say that today I am very happy with my tape system...also with my 48K RAM and versatile little Microline 80 printer...both of which together cost about what I would have had to pay for the expansion interface and just one disk drive - with only the same 16K RAM.

First let's whip the tape load problem. The major cause of unreliable program loading from cassette is volume level variation, in spite of the famous Model I

desensitizing fix. If my recent experience at the neighborhood Radio Shack store is any indication, this is still true with the otherwise vastly improved Model III. (There are also several minor causes which we will discuss in a later issue.) There is a great variation in the recording level of commercially produced tapes. This variation takes the form not only of overall recording level differences among tapes but also of wide volume swings on the same tape from one moment to the next. System tapes are notoriously bad in this respect.

The answer to volume variations is, simply, to provide a meter so that you can literally "see" the volume your recorder is feeding your computer.

That's all any experienced electronics hobbyist needs to be told, but I'm afraid I have already discouraged the many of you who have never done any electronic assembly. Don't worry. There are several ways to skin this cat. I'm a relative greenhorn too, and my way is not elegant, to say the least. It will probably send the electronic whizzkids into gales of laughter. But who cares? It works great.

Figure 1 is a list of the parts you need. The VU Meter last appeared in the 1978 Radio Shack catalog and is getting very hard to find. You may have to locate another electronic parts shop and buy one there. Cost of these items is around \$16.00 or less, if you can get some of that scrap wire the phone company repairmen are always leaving behind. This is the minimum box to get you started.

Mount the jacks in two rows of three along the rear of the black box (Figure 2). Leave room for a top row of three in case you decide to add a second recorder later. The box in Figure 2 has had this third row added. They are *not* required for the configuration we are describing here. Place a subminiature jack in each row, one above the other. Mount the meter in the center top of the box as shown in Figure 3. The momentary "on" switch goes in the

lower right corner of the top. Now you're ready to wire these items as shown in the photo wiring diagram (Figure 4). For the four miniature jacks (the left four), be sure to get positives and negatives connected properly. Positive is the terminal opposite the spring contact which will engage the tip of the plug when it is inserted. The plus terminal on the meter is clearly marked on the back of the meter.

Polarity doesn't matter when connecting the two subminiature jacks on the right. Unfortunately, Radio Shack doesn't seem to offer an "open" (two contact) subminiature jack these days. When you are looking at the bottom of the jack, hold the spring contact for the tip in the twelve o'clock position. The two contacts you will use are located at three o'clock and at six o'clock. In the photo we have snipped off the unneeded connectors.

Wish we could talk about soldering technique here, but there isn't space. Don't worry about excess heat. There are no parts you can damage without really trying to.

You could probably use a cardboard box if you had to, and cut the necessary holes with an Xacto knife. I suspect you could wrap the bare wire ends around the contacts and apply liquid solder from a squeeze tube...but don't say I told you to. Just don't short any circuit by letting two bare wires touch. Perhaps you have a friend who can make this box for you. By all means, move heaven and earth to get the thing made. It's really worth the trouble.

You'll need three patch cords. Two have miniature plugs on each end, preferably color coded, one pair with red jacks on each end and one pair with black. The third has subminiature plugs on each end. These can be bought if you are not up to making them. Any color will do as long as you remember which is which when you hook them up. Hooking up the box to your TRS-80 is a simple matter. Cassette plugs from the CPU go into the bottom row. Black goes into the

leftmost jack which has the meter across it. Large gray goes into the middle, and small gray goes, naturally into the remaining jack in the bottom row. The black patch cord goes into "Earphone" or "Monitor" on the recorder and into the jack above the black computer plug. The red patch cord goes into "AUX" of course, and into the jack above the large gray computer plug. Where the patch cord with the subminiature plugs goes is pretty obvious. Do what I'm about to tell you now and your tape loading troubles should be about 90% over.

Before you use this rig you must mess up the zero setting on the meter. With a small screwdriver, turn the adjusting screw on the meter face until the needle goes as high as you can get it. This will probably be a bit below -7 if you are using the Radio Shack meter we listed. Who cares about accurate decibel readings anyway? You just want to watch the needle move...and move with maximum sensitivity to the volume output of the recorder. There are probably some other meters that would be a little more elegant, plus adding some electronic gadgets to the circuit. But let's not get technical, OK?

Now you are ready for business. Get out the easiest loading tape you have. I hope you have one! This will be your calibration standard. Load it into the recorder and press "PLAY". The recorder will only play as long as you hold the momentary button down. You aren't CLOADing at this point, just metering the recorder signal. If the volume is high enough, the meter needle will move when the tape is playing. With one finger on the button, and the program (not necessarily from the start) passing the tape head, adjust the volume control until you get about a -3 reading. This assumes your "silent" setting is a little less than -7 as we said above.

Take your finger off the button and rewind the tape, using the button again if your recorder won't rewind without this help. Now try a CLOAD. Lot's of luck. You now do this same thing several times, "listening" (looking at the meter) to the tape volume and adjusting for a different meter reading each time. Test each setting by attempting a CLOAD. If this sounds laborious, remember, you're calibrating your meter. It's a once in a lifetime job.

For your guidance in diagnosing the numerous failures you are bound to get when you are above or below the good range, I offer the following:

**VOLUME MUCH TOO HIGH:** No stars in the corner.

**VOLUME SOMEWHAT TOO HIGH:** Two unblinking stars.

**VOLUME A TRIFLE LOW:** An apparent good load that displays "garbage" when you try to LIST it.

**VOLUME MUCH TOO LOW:** No stars in the corner.

I sure hope your easy loading standard tape isn't too long!

When you are through with the above ordeal you will have found the upper and lower limits of the meter readings which give you good loads. Be sure to write them down. You will soon have them memorized, but in the meantime you will need to refer to your written observations. Your ideal CLOADing volume is right in the middle of this range. This you will memorize instantly. Now the fun really begins!

Try some store-bought tapes...some system tapes, if you have any. Remember to check their recording level first without CLOAD as we did above. Surprise! They are all over the lot, aren't they? You now can make them behave by adjusting the volume during a test "play" so the meter hangs in there on your "ideal"

#### PARTS LIST

Figure 1

ITEM	RADIO SHACK #	APPROX COST
Hobby Box	270-627	2.39
VU Meter	22-053	8.95*
Pushbutton	275-618	1.59
Miniature Jacks (4)	274-251	1.19 for (3)
Subminiature Jacks (2)	274-292	1.19 for (2)

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Figure 2  
End view of meter box

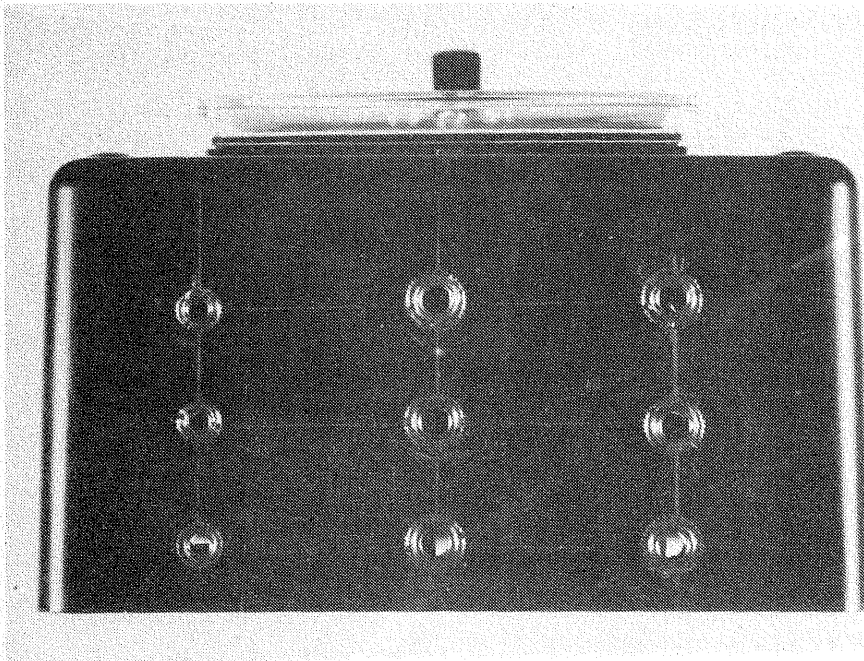
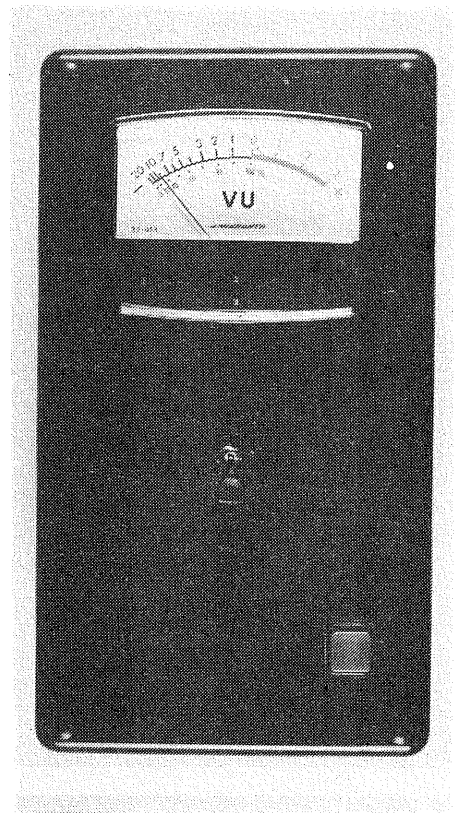


Figure 3  
Top view of wired box



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Circle 51



volume. Some system tapes will "yo-yo" up and down the dial. For these you must set the volume so that the needle moves back and forth within the "good" range you so laboriously discovered during your calibration chore. Darned critical, isn't it? How did you ever find just that spot on the little black dial without the meter? Now you see why you have had all that hassle with system tapes in the past.

That's about it, except to observe that you can now spot a defective tape by eye. Occasionally a program will

just go dead on the meter firing a load and perhaps come to life just enough to trigger a READY prompt at the end of the CLOAD. Don't waste your time on it. It's a dud. Try the second recording most manufacturers furnish and hope for the best. Once you become familiar with this outfit you should have, as we said earlier, about 90% confidence in getting a good CLOAD on the first try. Next time, we will help you get that to 99% or better. ●

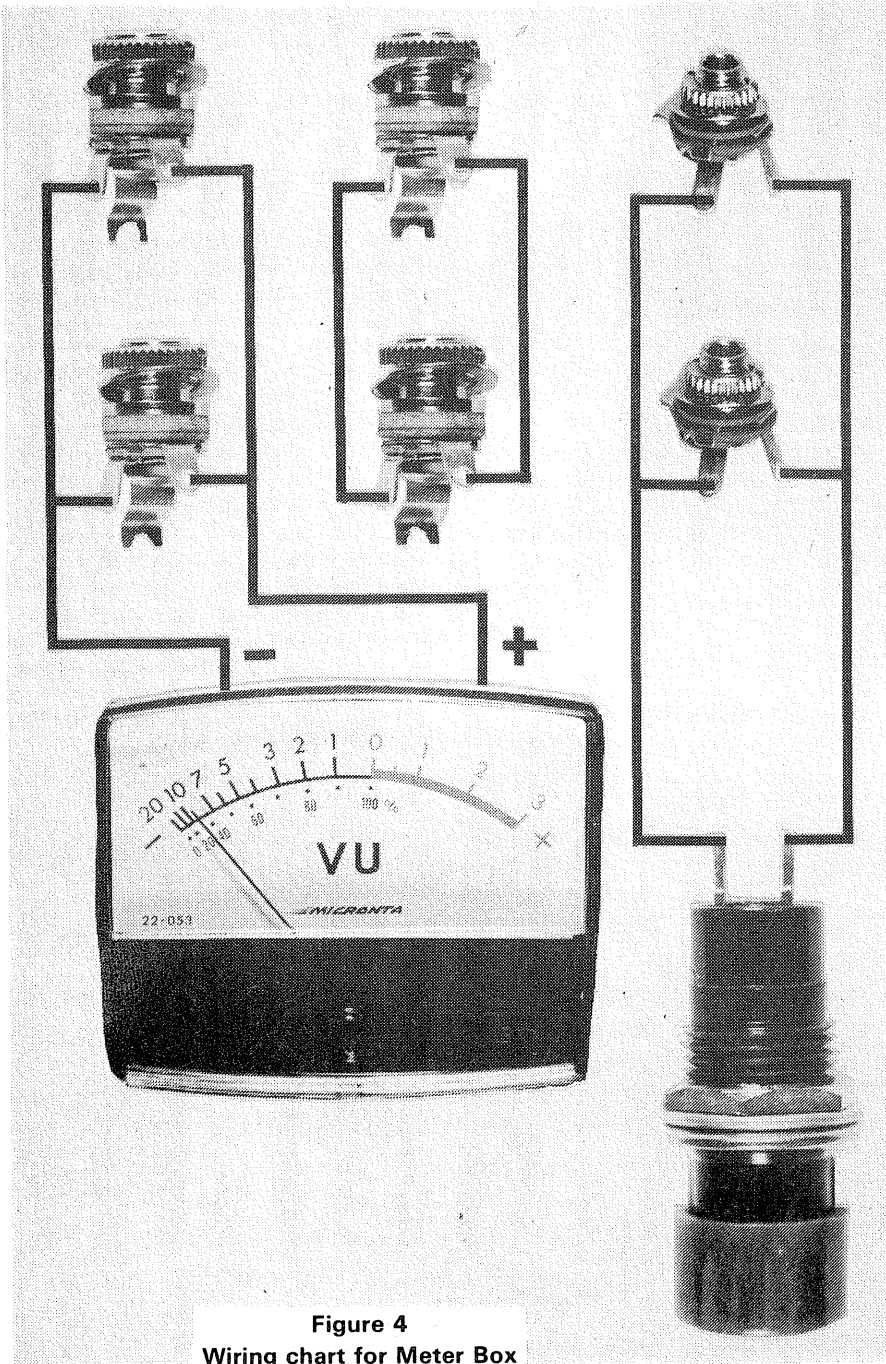
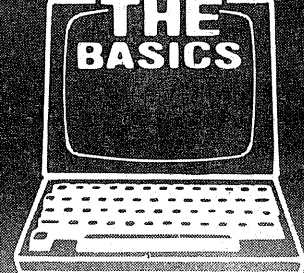


Figure 4  
Wiring chart for Meter Box

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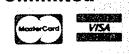
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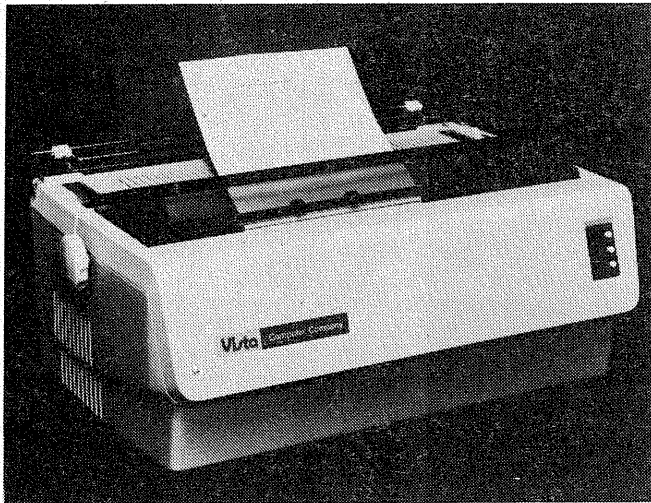


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Vista's Daisy Wheel Printer

# RATE YOUR PRINTER

## 80-U.S. Staff

At a recent visit to a Radio Shack computer center we had the chance to sit down and do a series of evaluations on new products. One of our first was to evaluate printer throughput. We did this on all the printers available at the time and the results are included in Figure 1.

### The Line Printer VII

In the process of the printer tests, we got a good look at the Line Printer VII. This little unit is a bargain at \$399.00 for the person who cannot afford a larger, more expensive printer.

It prints 80 characters per line and the throughput shows it was rated as well as any dot matrix printer. It is small and must be used with tractor paper.

The ribbon is a bear to load; both a technician and a salesman worked for about ten minutes before the ribbon was in and functional. All this says is that Radio Shack made the ribbon a little tight. We think that most people will get the hang of it after they do it once or twice.

The print quality is less than desired from this single pin matrix head. It is somewhat fuzzy around the edges and not as crisp as can be obtained from printers of this type.

In the meantime, it is worth the price if you can't afford more...but don't expect letter quality.

### The Daisy Wheel II

One of the most powerful printers

Radio Shack marketed to date has to be the Daisy Wheel II. This printer was forced on Radio Shack when Data Products couldn't produce enough Diablo-style printers to fill the demand. The original Daisy Wheel I also had problems that caused most technicians to shudder whenever they saw one coming in for delivery. Most glaring was the problem of tearing ribbons. It was also very noisy.

Radio Shack contracted with a Japanese firm, Ricoh, to produce the new Daisy Wheel II. While waiting for first deliveries, the company contracted with Qume to fill the back orders when Data Products couldn't deliver. The Qume was also noisy and tore up ribbons.

FIGURE 1  
RESULTS OF THROUGHPUT TESTS

Printer Make & Model	Rated CPS	Labels CPS	20 CPL CPS	40 CPL CPS	80 CPL CPS	Forms CPS	Average CPS	Ratio %	Bi-Directional	
RS LPII	100	30.0	28.6	38.5	47.6	16.7	32.4	32.4	N	Note 1
" LPIII	120	70.6	62.5	90.9	100.0	36.6	72.1	60.1	Y	
" LPIV	50	22.6	22.6	27.0	31.3	13.3	23.7	46.7	N	
" LPV	160	75	71.4	90.0	111.1	36.6	62.2	38.8	Y	
" LPVI	100	57.1	50	66.7	76.9	30	56.1	56.1	Y	
" LPVII	30	17.1	17.5	21.7	25	9.4	18.1	60.5	N	
" DWII-12 CPI	43	42.0	40	45.5	45.5	34.4	41.7	96.9	N	Note 2
" DWII-10 CPI	43	41.4	40	43.5	43.5	33.4	40.4	94.9	N	
Centronics 702	120	66.7	58.8	71.4	83.3	46.8	65.4	54.5	Y	
Starwriter I	25	27.3	27	27.8	27.8	21.3	26.2	104.8	Y	

Notes: 1 - RS is Radio Shack; LP is Line Printer.  
2 - DW is Daisy Wheel; CPI is characters per inch.

The new Daisy does *not* use a Diablo-style wheel as the previous models did. This limits the choice of type styles, but that should be a small matter as most users do not change wheels very often. The ribbon is a one pass carbon, producing high quality results. At this point however, that ribbon needs some work.

Most carbon ribbons used in Daisy Wheel printers are multi-strike. That is, they advance less than one character width to optimize ribbon useage. This results in the same area

throughput tests. Actual burst speed is probably close to that or better, and it slews to the next print position while printing text with spaces. Also, during top of form paper advances, the print head will be positioned at the column location of the next line of print while the paper is still in motion. This accounts for its excellent throughput ratio for forms.

The Daisy Wheel II specifications are impressive: 43 cps (characters per

(text continued on page 83)

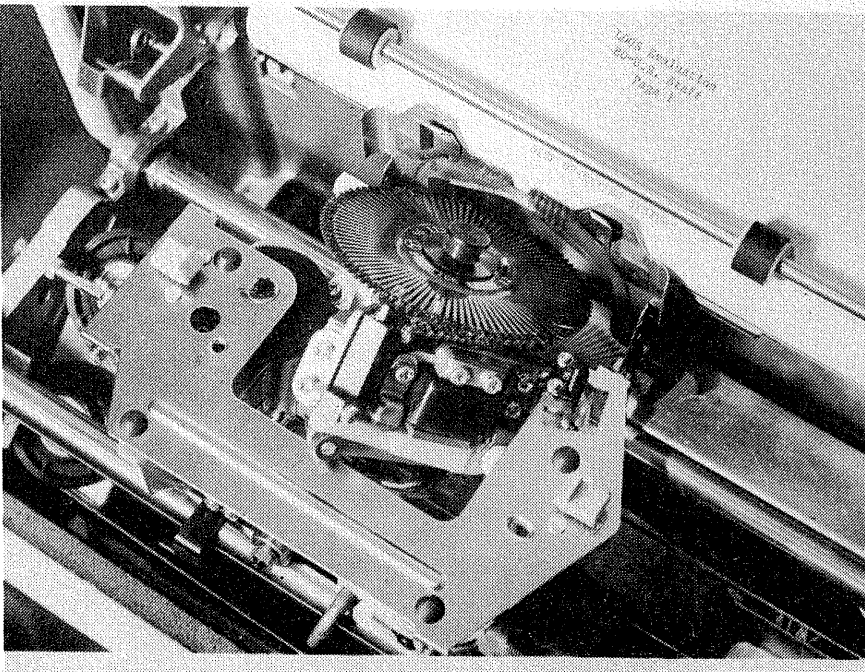


Radio Shack's new Line Printer V looks like the Line Printer III

"...the Daisies were easily at or better than, their rated speeds."

of the ribbon being used two to five times. As a result, we experienced some weakness in print quality, although sharpness was not lost.

The performance and speed of this printer were impressive. While not a particularly quiet printer, it does have to rank as being less noisy than its two predecessors. It is rated at 43 characters per second, which it achieved without difficulty in the



Close-up of the Starwriter I Printer mechanism and wheel

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## Hardware Evaluation

```
10 CLEAR 1000
20 A$="ABCDE FGHIJ KLMNO PQRST UVWXY Z01
23 45678 9!#$% &*()- +=j': ;.><, ?/abc d
efg hi"
30 B$=LEFT$(A$,40)
40 C$=LEFT$(A$,20)
50 D$=LEFT$(A$,30)
51 E$="TEST NUMBER ONE: LABELS
    ##### SECONDS; ###.# CHARS PER SEC
OND"
52 F$="TEST NUMBER TWO: 20 CHAR/LINE
    ##### SECONDS; ###.# CHARS PER SEC
OND"
53 G$="TEST NUMBER THREE: 40 CHAR/LINE
    ##### SECONDS; ###.# CHARS PER SEC
OND"
54 H$="TEST NUMBER FOUR: 80 CHARS/LINE
    ##### SECONDS; ###.# CHARS PER SEC
OND"
55 I$="TEST NUMBER FIVE: FORMS
    ##### SECONDS; ###.# CHARS PER SEC
OND"
60 PRINT"ENTER PRINTER DESCRIPTION";
70 INPUT DS$
80 PRINT"ENTER ADVERTISED CPS";
85 INPUT CP
90 PRINT"STARTING TESTS"
95 GOSUB 100 : GOTO 110
100 SYSTEM "TIME 00.00.00"
105 RETURN
110 FOR A=1 TO 10
120 FOR B=1 TO 4
130 LPRINT D$
140 NEXT B
150 LPRINT" "
160 LPRINT" "
170 NEXT A
175 GOSUB 180 : GOTO 210
180 LPRINT" ":TF$=TIME$
190 T=(VAL(MID$(TF$,4,2))*60)+(VAL(MID$(
TF$,7,2)))
200 RETURN
210 T1=T
220 GOSUB 100
230 FOR A=1 TO 50
240 LPRINT C$
250 NEXT A
260 GOSUB 180
270 T2=T
280 GOSUB 100
290 FOR A=1 TO 25
300 LPRINT B$
310 NEXT A
320 GOSUB 180
330 T3=T
340 GOSUB 100
350 FOR A=1 TO 12
360 LPRINT A$
370 NEXT A
380 LPRINT B$
390 GOSUB 180
400 T4=T
410 LPRINTCHR$(12);
420 GOSUB100
430 FOR A=1T03
440 FOR B=1T04
450 LPRINTTAB(25)D$
460 NEXTB
470 LPRINT" "
480 LPRINTTAB(60)C$
490 LPRINT" "
500 FOR B=1T03
510 LPRINT D$
520 NEXT B
530 LPRINT" "
540 FOR B=1T04
550 LPRINT C$;TAB(50)C$
560 LPRINT" "
570 NEXT B
580 LPRINTCHR$(12);
590 NEXT A
600 GOSUB 180
610 T5=T
620 CLS
630 PRINT"RESULTS FOR "DS$" RATED AT "CP
" CHAR. PER SECOND"
640 LPRINT"RESULTS FOR "DS$" RATED AT "C
P" CHAR. PER SECOND"
650 PRINT:LPRINT" "
660 PRINTUSINGE$;T1;1200/T1
670 LPRINTUSINGE$;T1;1200/T1
680 PRINTUSINGF$;T2;1000/T2
690 LPRINTUSINGF$;T2;1000/T2
700 PRINTUSINGG$;T3;1000/T3
710 LPRINTUSINGG$;T3;1000/T3
720 PRINTUSINGH$;T4;1000/T4
730 LPRINTUSINGH$;T4;1000/T4
740 PRINTUSINGI$;T5;1170/T5
750 LPRINTUSINGI$;T5;1170/T5
760 LPRINTCHR$(12)
770 END
1000 FOR A=32 TO 254
1020 LPRINTUSING" ##### \ \";A;CHR$(A);
1025 IF AMOD10=0 THEN 1050
1030 NEXT A
1040 STOP
1050 LPRINT
1060 GOTO 1030
```

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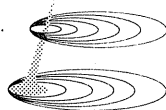
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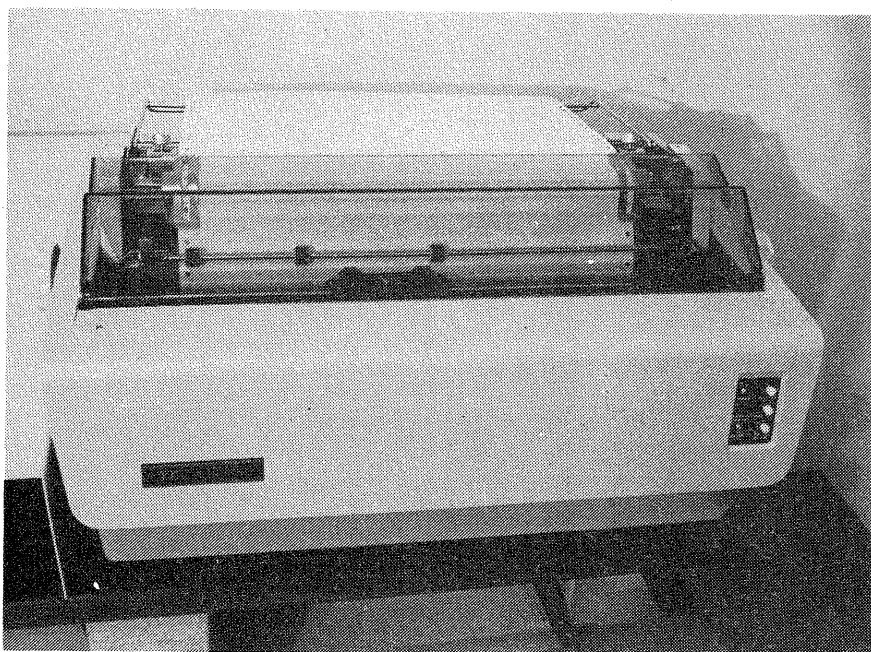
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C. Itoh Starwriter I 25 cps bi-directional Daisy Wheel Printer

second) rated and measured at 43.5 on 10 cpi (characters per inch) and proportional spacing and 45.5 cps for 12 cpi. The carriage return speed for this single directional printer is rated at 300 milliseconds for 13.6 inches of head movement. This rating must be close to accurate as the throughput measurements are excellent.

Line feed can be set to either 1/12 or 1/6 of an inch, which corresponds to half or full typewriter line spacing. The actual printer wheel has 124 character positions with three wheels being available at the time of this writing.

Characters per line are 136 for 10 cpi and 163 for 12 cpi. There are three levels of impression available and the print wheel life is rated at 40 million characters. Ribbon life is rated at 270,000 characters. The interface is 8-bit parallel data with strobe conforming to Centronics standards. A character set beyond the standard ASCII set is supported.

All switch settings except impression can be controlled by software from a Basic program. Reverse paper movement can be controlled in both full reverse line feed and reverse half-line feed increments

which will allow superscripting and subscripting. Also, head movement may be controlled in increments down to 1/60 of an inch.

It is our opinion that the Daisy Wheel II represents the best value among the Daisies. The objection of a limited number of wheels to choose from will affect few users.

### The TEC FP-1500 Starwriter I

We obtained this printer from Lords Corp over four months ago and have been putting it through its paces. It has become the real workhorse for inhouse word processing needs and program listings for publication.

The Daisy Wheel II notwithstanding, this printer also represents an excellent buy. Though it runs slower than the Daisy Wheel II at 25 cps rated, 25.5 cps throughput tested, it nevertheless turns in an admirable performance. The accompanying photo shows it to be well constructed and we have had no problems with the ribbon. It is hard to criticize this printer. It does its job and does it well.

The specifications are as follows: 25 cps on 136 character print line at 10 cpi, and 163 characters per line at 12 cpi. Print spacing down to 1/20 of an inch and line spacing down to 1/48 of an inch, software controllable. It uses standard Diablo plastic print wheels with 96 characters. The interface is standard Centronics parallel. It can use a carbon multi-strike or fabric ribbon interchangeably.

The included manual is well written. The printer, manufactured by C. Itoh Electronics, Inc, is the same printer that is sold by a number of vendors. VISTA also markets this unit under their name.

The Daisy Wheel II from Radio Shack has a high speed return and requires a *very solid* table or stand. The Starwriter is bi-directional and quite stable. Thus, it does not require as solid a table or stand and can be easily placed next to your computer without shaking things while printing. Noise level appears to be similar to that of the Daisy Wheel II.

We did not test the higher speed Starwriter, but can report that it supports proportional spacing and sports a 45 cps print speed.

### The Line Printer V

The Line Printer V is a faster version of the Line Printer III and has a couple of additional features. For one thing, it supports a better looking lower case as well as a complete graphics set

similar to the Line Printer VI. Also, the top switch panel was redesigned and it is much harder to accidentally knock this printer off line than the Line Printer III.

Like most of the other dot matrix designs we tested, this printer also does poorly in throughput. We have yet to come up with a plausible answer for this difference in ratings.

---

***"Without a doubt, the results will be a shock to many people who have gone along with the idea that a 160 cps printer actually prints at 160 cps."***

---

### Printer Throughput Tests

The numbers in Figure 1 represent actual times as recorded by the Model II test in the listing. Whether the discrepancies are the result of a different method of measuring characters per second, or some other fault of which we don't know, we decided to go ahead and publish these early findings with the request that you, our readers and advertisers make the same tests and send us your results. If you have a program which results in more accurate readings, let us know. Without a doubt, the results will be a shock to many people who have gone along with the idea that a 160 cps printer actually prints at 160 cps.

After consideration of varying applications in which a printer would be used, the following criteria was established.

1. Printing of labels: A typical label contains a maximum of 4 lines of thirty characters with spaces. The actual label is six lines long. In practice a label is probably closer to three lines of 25 characters. However, some printers complete a full line motion as if printing to initiate a line feed, so we chose 4 lines of 30 characters (the last being a space) for the test and

produced 10 labels, or 1200 characters. This would represent the worst case for labels.

2. Short, medium and long lines of groups of characters followed by a space were chosen to represent text printing of listings, letters, etc. In each case, 1000 characters were produced.

3. Forms are often printed in small businesses, the most common being a statement. This one contains a header, an address block, a date and four lines of detail followed by a top-of-form. Page length is standard at 66 lines and three forms, for a total of 1000 characters.

### The Results

Actual measured results showed that the dot matrix group as a whole only produced 75% of the rated speed for bi-directional printers, while single direction units accomplished only 60%. The Centronics group represented by the 702 and the Line Printers II and IV from Radio Shack did the poorest, while the Daisies were easily at or better than their rated speeds.

These figures are not, by any means complete. This month's reader service card has a place for you to send in your results of the same test. Model I and III users will want to modify the Time sections of the program to obtain the needed results and may have to use a stop watch for rough timing. ●

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We have. We wrote OMNI-KEY. And if you had OMNI-KEY, your programming would not only be less tiresome, but more productive. How? Well, when was the last time these little annoyances got under *your* skin?

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**Repetitive Keying of the Same Character.** OMNI-KEY has autorepeat. Hold any key down, and it repeats about eight per second.

**Typing Out Common Keywords.** OMNI-KEY lets you assign BASIC keywords to the *SHIFT*-letter keys. Type *SHIFT-P*, for example, and you get PEEK(), or whatever you've made that key represent.

**Repetitive Keying of Similar Phrases.** Have you typed "DATA x, y, z *ENTER*" one too many times? OMNI-KEY's macro key types the repetitive stuff with a single keystroke. You just fill in the blanks. In fact, it's possible to enter hundreds of DATA statements in a row without typing line numbers, "DATA", or the commas! OMNI-KEY's unique macro pause and macro repeat make it possible. And you program the macro key any time and any way (up to 80 characters) you see fit.

The "What's on the right of the cursor?" EDIT Mode. Come on. You don't need to put up with this half-blindness when editing a program. If the statement is listed on the screen (even a multi-liner), OMNI-KEY lets you edit it *in place and in full view* with its movable cursor. And you don't need any fancy commands to do

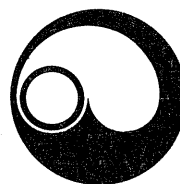
it, either. To insert characters, just type them -- the lines will shift to accommodate them. Deletions are even easier -- just hit the *CLEAR* key. Need to move a statement? Just edit the line number! It's that easy.

Separate Drivers for Lower-case, Printers, Video Display, etc., etc. OMNI-KEY has its own lower-case driver and shifting built in. But the real beauty of the beast is what you can add to it. If you can use the Editor/Assembler, you can write your own OMNI-KEY modules. OMNI-KEY has a configuration mode which reads your specially-assembled SYSTEM tapes and merges them with the OMNI-KEY functions into *one single load module*. OMNI-KEY, in its standard and customized forms is equally at home with Level II or Disk BASIC, and you don't even have to set MEMORY SIZE to use it! Just enter BASIC, LOAD or CLOAD OMNI-KEY and RUN. It activates itself, reserves its own memory, and waits in the background until needed. Pretty simple.

Simplicity. That's the power of OMNI-KEY. It's simple, it's easy to live with, and it lets you, the programmer, do what you do best. Program. Without the tedium, without the aggravation, and, best of all, without spending a lot of bucks. At only \$23, OMNI-KEY has got to be the best deal going! And if you're a mere human, that's something to think about.

OMNI-KEY cassette for TRS-80 Model I, Level II and Disk BASIC, instructions, postpaid to any U. S., Canadian, or Mexican address. Others are F. O. B. Port Townsend. VISA and Mastercharge are welcome. Dealer inquiries are invited.

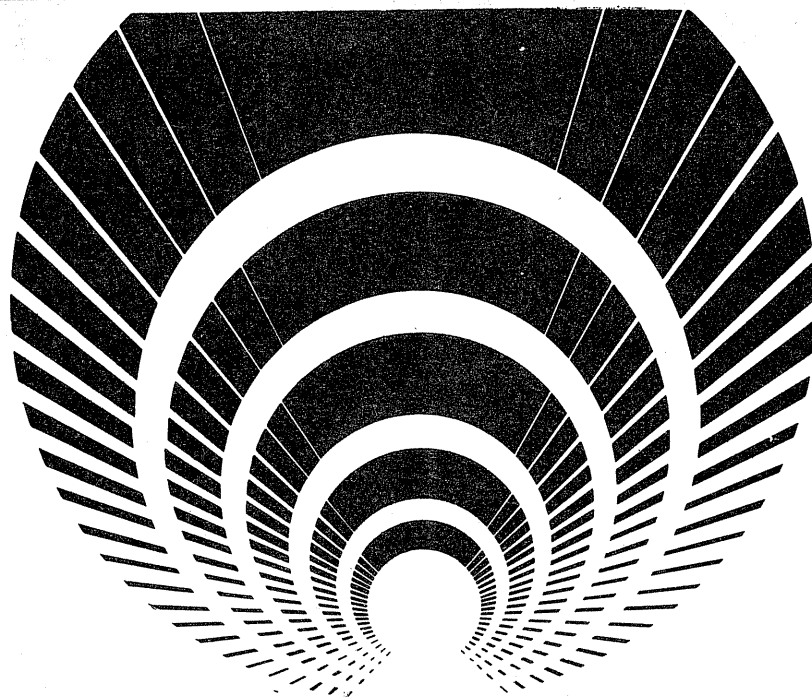
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# Sundance

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**Color Computer: 16K Extended Color Basic**

Have you ever had the urge to catch a falling star? Well, here is your chance. For openers, go out and look up into the sky.

Now that you have had the opportunity to look at the real thing, power up your Model I, III, or Color Computer and key in the following program. For Models I and III, memory must be set at 32511 for 16K or 45000 for Disk. The Color Computer does not require any memory reservation.

The Color Computer listing is done in 32-character lines for ease of entry. While the listing is shorter, it will not give quite the same results. For one thing, it runs slower. A complete explanation of all the differences is included in the Color Computer article in this issue.

Sundance is a relatively simple game, consisting of two to four suns which bounce back and forth between two 3 X 3 grids viewed in perspective. If a sun bounces off the upper far left block on the grid, it will bounce on the far left block of the lower grid. The object of the game is to capture as many suns as possible in a given length of time by opening a hatch in the lower grid *at the right time*. The instructions will display which keys to use.

Sound is provided through the television speaker for Color Computer users and through the cassette port for Model I and III users.

Listing 1  
TRS-80 16K Tape Model I/III

```
SUNDANCE      16k Tape Version
10 REM * SUNDANCE * VERSION 4.1 * 29-DE
   CEMBER-1980 *
20 REM * COPYRIGHT 1980 * A JON WAPLES
   PRODUCTION *
30 REM * DON'T FORGET TO SET MEMORY SIZ
   E AT 32511! *
40 REM * INITIALIZE VARIABLES *
50 RANDOM: CLEAR1125: DEFINT A-B, E-F, J-Q, V
   -Z: DEF SNGC: DEF STRD, G-I, R-U
60 T1=CHR$(168)+CHR$(151)+STRING$(4,131
   )+CHR$(139)+CHR$(132)+CHR$(170)+CHR$(
   149)+CHR$(196)+CHR$(170)+CHR$(149)+CH
   R$(170)+CHR$(159)+CHR$(180)+CHR$(195)
   +CHR$(170)+CHR$(149)+CHR$(170)+CHR$(1
   51)+STRING$(3,131)+CHR$(139)+CHR$(180
   )+CHR$(194)+CHR$(160)+CHR$(158)
70 T1=T1+STRING$(2,131)+CHR$(173)+CHR$(
   144)+CHR$(128)+CHR$(170)+CHR$(159)+CH
   R$(180)+CHR$(195)+CHR$(170)+CHR$(149)
   +CHR$(168)+CHR$(151)+STRING$(4,131)+C
   HR$(139)+CHR$(132)+CHR$(170)+CHR$(151
   )+STRING$(5,131)+CHR$(129)
```



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- Operates with or without line numbers
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- Recovers from most DOS errors
- Fast file entry point map
- Change text command for any number of occurrences
- DOS Directory and Kill commands
- Line printer paging with adjustable forms
- Sophisticated reprinting line editor, handles line feeds
- Disk BASIC, Disk EDTASM, and EDIT-80 format compatible
- Display status command, includes free memory, current pointer printer forms, number of input files, output filename and format.

XEDIT will handle files of any size up to 2.7 Megabytes or 10K lines in length. Comes complete with instructions covering operation, externals, and file formats.

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Formatted diskette . . . . .	\$89.95
Model III (32K single disk system)	
Formatted diskette . . . . .	\$79.95
Cassette tape . . . . .	\$75.95

ASM/CMD, a disk based assembler which generates object code to disk or tape (disk only on Model II). Accepts any file format including ASCII Disk BASIC. Listing may be outputted to display, disk file, or paged with adjustable forms to printer. Operates under standard Z80 Zilog Mnemonics with 9 pseudo operations. Comes complete with operating manual.

Model I (16K single disk system)	
Formatted diskette . . . . .	\$34.95
Cassette tape . . . . .	\$29.95
Model II	
Formatted diskette . . . . .	\$59.95
Model III (32K single disk system)	
Formatted diskette . . . . .	\$49.95
Cassette tape . . . . .	\$45.95

PACK/CMD removes spaces from text files generated by XEDIT, and EDIT-80 to reduce file lengths by 5 to 40 percent. PACK will also strip comment fields and line numbers for additional space savings. Text can be masked for upper case only. Does not destroy compatibility of assembly and FORTRAN source files. Comes complete with instructions.

Model I (16K single disk system)	
Formatted diskette . . . . .	\$14.95
Cassette tape . . . . .	\$ 9.95
Model II	
Formatted diskette . . . . .	\$19.95
Model III (32K single disk system)	
Formatted diskette . . . . .	\$14.95
Cassette tape . . . . .	\$ 9.95

Special package, XEDIT, ASM, and PACK.

Model I	
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Cassette tape . . . . .	\$74.95
Model II	
Formatted diskette . . . . .	\$149.95
Model III	
Formatted diskette . . . . .	\$129.95
Cassette tape . . . . .	\$125.95

XDIR/CMD, an extended directory that offers more than the standard TRSDOS™ directory. XDIR will do multiple drive directories with all file attributes including extent locations, file length, EOF index, EOF record, protection level, LRL, password indication, track lockout indication, and much more. XDIR will also display to the printer.

Model I (16K disk system)	
Formatted diskette . . . . .	\$19.95
Cassette tape . . . . .	\$15.95

CALL/CMD extends and improves the TRSDOS™ AUTO function. Can be enabled and disabled by prompts, and through keyboard, resident program, or the call file.

Model I (16K single disk system)	
Formatted diskette . . . . .	\$19.95
Cassette tape . . . . .	\$15.95

TANDON/CMD improves TRSDOS™ by allowing higher step rate, extending access to 40 tracks for the new Tandon disk drives. Also fixes the break key problem.

Model I (16K single disk system)	
Formatted diskette . . . . .	\$14.95
Cassette tape . . . . .	\$ 9.95

DEXER/CMD, a disk exerciser emulator program designed to speed repair of any TRS-80™ compatible disk drive. DEXER eliminates the need for the Shugart SA809 test fixture and decreases repair time with easy to use commands and on screen display of required set up data. DEXER was written specifically for the repair technician and Shugart or Tandon disk drives. Shugart alignment diskette or equivalent and a 30Mhz oscilloscope required. One key commands allow easier adjustments necessary for Shugart alignment. DEXER is not for general disk testing and is recommended only for service personnel who have previous experience in disk drive repair.

Model I (16K single disk system)	
Formatted diskette . . . . .	\$24.95
Cassette tape . . . . .	\$19.95

Dip shunts for conversion and upgrades for the TRS-80™. Comes complete with instructions for A, D, E, and G level boards and new 2 chip level II.

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Circle 32

- 80 T2=CHR\$(130)+CHR\$(173)+STRING\$(4,176)+CHR\$(144)+CHR\$(128)+CHR\$(170)+CHR\$(149)+CHR\$(196)+CHR\$(170)+CHR\$(149)+CHR\$(170)+CHR\$(149)+CHR\$(130)+CHR\$(173)+CHR\$(144)+CHR\$(128)+CHR\$(170)+CHR\$(149)+CHR\$(170)+CHR\$(149)+CHR\$(196)+CHR\$(170)+CHR\$(149)+CHR\$(168)
- 90 T2=T2+CHR\$(151)+CHR\$(196)+CHR\$(171)+CHR\$(148)+CHR\$(170)+CHR\$(149)+CHR\$(130)+CHR\$(173)+CHR\$(144)+CHR\$(128)+CHR\$(170)+CHR\$(149)+CHR\$(170)+CHR\$(149)+CHR\$(198)+CHR\$(170)+CHR\$(181)+STRING\$(5,176)+CHR\$(144)
- 100 T3=CHR\$(198)+CHR\$(171)+CHR\$(148)+CHR\$(170)+CHR\$(149)+CHR\$(196)+CHR\$(170)+CHR\$(149)+CHR\$(170)+CHR\$(149)+CHR\$(194)+CHR\$(139)+CHR\$(180)+CHR\$(170)+CHR\$(149)+CHR\$(170)+CHR\$(149)+CHR\$(196)+CHR\$(170)+CHR\$(149)+CHR\$(170)+CHR\$(151)+STRING\$(4,131)+CHR\$(171)
- 110 T3=T3+CHR\$(149)+CHR\$(170)+CHR\$(149)+CHR\$(194)+CHR\$(139)+CHR\$(180)+CHR\$(170)+CHR\$(149)+CHR\$(170)+CHR\$(149)+CHR\$(198)+CHR\$(170)+CHR\$(149)+CHR\$(198)
- 120 T4=CHR\$(136)+CHR\$(180)+STRING\$(4,176)+CHR\$(186)+CHR\$(133)+CHR\$(138)+CHR\$(181)+STRING\$(4,176)+CHR\$(186)+CHR\$(133)+CHR\$(170)+CHR\$(149)+CHR\$(195)+CHR\$(130)+CHR\$(175)+CHR\$(149)+CHR\$(170)+CHR\$(181)+STRING\$(3,176)+CHR\$(184)+CHR\$(135)+CHR\$(128)+CHR\$(170)
- 130 T4=T4+CHR\$(149)+CHR\$(196)+CHR\$(170)+CHR\$(149)+CHR\$(170)+CHR\$(149)+CHR\$(195)+CHR\$(130)+CHR\$(175)+CHR\$(149)+CHR\$(138)+CHR\$(181)+STRING\$(4,176)+CHR\$(184)+CHR\$(132)+CHR\$(170)+CHR\$(181)+STRING\$(5,176)+CHR\$(144)
- 140 U1=CHR\$(139)+CHR\$(147)+STRING\$(19,131)+CHR\$(151)+STRING\$(18,131)+CHR\$(171)+STRING\$(19,131)+CHR\$(163)+CHR\$(135)
- 150 U2=CHR\$(130)+CHR\$(164)+CHR\$(210)+CHR\$(170)+CHR\$(210)+CHR\$(149)+CHR\$(210)+CHR\$(152)+CHR\$(129)
- 160 U3=CHR\$(137)+STRING\$(18,176)+CHR\$(181)+STRING\$(16,176)+CHR\$(186)+STRING\$(18,176)+CHR\$(134)
- 170 U4=CHR\$(130)+CHR\$(164)+CHR\$(208)+CHR\$(170)+CHR\$(208)+CHR\$(149)+CHR\$(208)+CHR\$(152)+CHR\$(129)
- 180 U5=CHR\$(137)+CHR\$(144)+CHR\$(207)+CHR\$(149)+CHR\$(206)+CHR\$(170)+CHR\$(207)+CHR\$(160)+CHR\$(134)
- 190 U6=CHR\$(130)+CHR\$(167)+STRING\$(14,131)+CHR\$(171)+STRING\$(14,131)+CHR\$(151)+STRING\$(14,131)+CHR\$(155)+CHR\$(129)
- 200 U7=CHR\$(137)+CHR\$(144)+CHR\$(205)+CHR\$(149)+CHR\$(204)+CHR\$(170)+CHR\$(205)+CHR\$(160)+CHR\$(134)
- 210 U8=CHR\$(130)+STRING\$(40,131)+CHR\$(129)
- 220 D1=CHR\$(160)+STRING\$(40,176)+CHR\$(144)
- 230 D2=CHR\$(152)+CHR\$(129)+CHR\$(205)+CHR\$(149)+CHR\$(204)+CHR\$(170)+CHR\$(205)+CHR\$(130)+CHR\$(164)
- 240 D3=CHR\$(160)+CHR\$(182)+STRING\$(14,176)+CHR\$(186)+STRING\$(14,176)+CHR\$(181)+STRING\$(14,176)+CHR\$(185)+CHR\$(144)
- 250 D4=CHR\$(152)+CHR\$(129)+CHR\$(207)+CHR\$(149)+CHR\$(206)+CHR\$(170)+CHR\$(207)+CHR\$(130)+CHR\$(164)
- 260 D5=CHR\$(160)+CHR\$(134)+CHR\$(208)+CHR\$(170)+CHR\$(208)+CHR\$(149)+CHR\$(208)+CHR\$(137)+CHR\$(144)
- 270 D6=CHR\$(152)+STRING\$(18,131)+CHR\$(151)+STRING\$(16,131)+CHR\$(171)+STRING\$(18,131)+CHR\$(164)
- 280 D7=CHR\$(160)+CHR\$(134)+CHR\$(210)+CHR\$(170)+CHR\$(210)+CHR\$(149)+CHR\$(210)+CHR\$(137)+CHR\$(144)
- 290 D8=CHR\$(184)+CHR\$(177)+STRING\$(19,176)+CHR\$(181)+STRING\$(18,176)+CHR\$(186)+STRING\$(19,176)+CHR\$(178)+CHR\$(180)
- 300 H(1,1)=CHR\$(184)+STRING\$(14,191)+CHR\$(149)
- 310 H(1,2)=CHR\$(160)+CHR\$(190)+STRING\$(15,191)
- 320 H(2,1)=STRING\$(14,191)
- 330 H(2,2)=CHR\$(186)+STRING\$(14,191)+CHR\$(181)
- 340 H(3,1)=CHR\$(170)+STRING\$(14,191)+CHR\$(180)
- 350 H(3,2)=STRING\$(15,191)+CHR\$(189)+CHR\$(144)
- 360 H(4,1)=CHR\$(184)+STRING\$(16,191)+CHR\$(149)
- 370 H(4,2)=CHR\$(160)+CHR\$(190)+STRING\$(17,191)
- 380 H(5,1)=STRING\$(16,191)
- 390 H(5,2)=CHR\$(170)+STRING\$(16,191)+CHR\$(149)
- 400 H(6,1)=CHR\$(170)+STRING\$(16,191)+CHR\$(180)
- 410 H(6,2)=STRING\$(17,191)+CHR\$(189)+CHR\$(144)
- 420 H(7,1)=CHR\$(184)+STRING\$(18,191)+CHR\$(151)

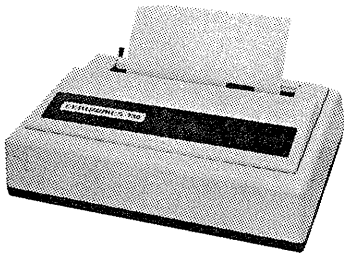
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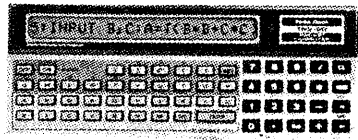
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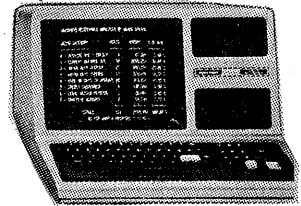
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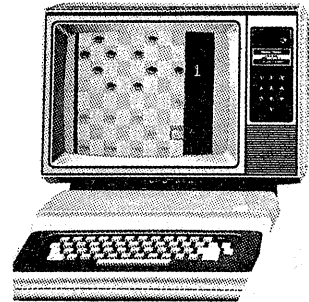
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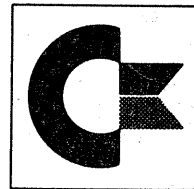


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## Fun & Games

```

430 H(7,2)=CHR$(160)+CHR$(190)+STRING$(
19,191)
440 H(7,3)=CHR$(184)+STRING$(20,191)+CH
R$(181)
450 H(8,1)=STRING$(18,191)
460 H(8,2)=CHR$(170)+STRING$(18,191)+CH
R$(149)
470 H(8,3)=STRING$(20,191)
480 H(9,1)=CHR$(171)+STRING$(18,191)+CH
R$(180)
490 H(9,2)=STRING$(19,191)+CHR$(189)+CH
R$(144)
500 H(9,3)=CHR$(186)+STRING$(20,191)+CH
R$(180)
510 S0=CHR$(25)+CHR$(255)
520 S1=CHR$(50)+CHR$(20)
530 S2=CHR$(50)+CHR$(40)
540 S3=CHR$(50)+CHR$(60)
550 S4=CHR$(50)+CHR$(80)
560 S5=CHR$(50)+CHR$(100)
570 S6=CHR$(50)+CHR$(120)
580 S7=CHR$(50)+CHR$(140)
590 S8=CHR$(50)+CHR$(160)
600 S9=CHR$(50)+CHR$(180)
610 R1="SCORE: ###"
620 R2="TIME: #:##"
630 A2=30
640 A4=2
650 C1=30.5
660 P1=402
670 P2=414
680 P3=429
690 P4=207
700 P5=223
710 P6=240
720 P7=77
730 P8=96
740 P9=114
750 REM * POKE IN SOUND ROUTINE *

760 RESTORE:FORN1=32512T032578:READN2:P
OKEN1,N2:NEXTN1
770 IFPEEK(16396)=201THENPOKE16526,0:PO
KE16527,127ELSEDEFUSR=&H7F00:CMD"T"
780 DATA205,127,10,126,50,66,127,35,94,
35,86,235,43,58,64,56,203,87,192,58,6
6,127,183,200,61,200,61,50,66,127,35,
86,30,0,35,70,62,1,211,255,16,254,70,
60,211,255,16,254,70,122,183,32,7,123
,183,40,212,61,40,209,27,27,16,241,24
,225,0
790 REM * INTRODUCTION *
800 CLS:PRINT@384,T1,:PRINT@448,T2,:PRI
NT@512,T3,:PRINT@576,T4;
810 S=CHR$(1)+CHR$(255):FORN1=1T05:PRIN
T@281,"COPYRIGHT 1980";:PRINT@725,"A
90 JON WAPLES PRODUCTION";:FORN2=1T020:X
=USR(VARPTR(S)):FORN3=1T03:NEXTN3,N2:
PRINT@281,CHR$(206);:PRINT@725,CHR$(2
15);:FORN2=1T050:NEXTN2,N1
820 CLS:FORN1=1T075+RND(25):PRINT@RND(1
022),".":NEXTN1:GOSUB1990
830 REM * INSTRUCTIONS? *
840 PRINT@448,"DO YOU WANT INSTRUCTIONS
?";
850 I=INKEY$:IFI=""THEN850ELSEIFI="Y"TH
EN870ELSEIFI="N"THEN1060ELSE850
860 REM * INSTRUCTIONS *
870 PRINT@448,"
";:GOSUB1990
880 PRINT@1,"SUNDANCE IS A RELATIVELY S
IMPLE GAME. IT CONSISTS OF 2-4 SUNS"
;
890 PRINT@66,"THAT BOUNCE BETWEEN 2 3X3
GRIDS VIEWED IN PERSPECTIVE. IF A";

900 PRINT@132,"SUN BOUNCES OFF THE UPPE
R-FAR-LEFT BLOCK ON THE GRID, IT";
910 PRINT@197,"WILL THEN BOUNCE OFF THE
LOWER-FAR-LEFT BLOCK, GET IT?";
920 PRINT@263,"THE OBJECT OF THE GAME I
S TO CATCH AS MANY SUNS AS";
930 PRINT@328,"POSSIBLE. TO DO THIS YO
U OPEN A HATCH, 1 OUT OF";
940 PRINT@394,"9 LOCATED ON THE LOWER G
RID. USE THESE KEYS";
950 PRINT@459,"TO OPERATE THE HATCHES:
PRESS ENTER.";
960 PRINT@594,"7";:PRINT@607,"8";:PRINT
@621,"9";:PRINT@780,"4(OR U)";:PRINT@
796,"5(OR I)";:PRINT@813,"6(OR O)";:P
RINT@906,"1(OR J)";:PRINT@924,"2(OR K
)";:PRINT@943,"3(OR L)";
970 I=INKEY$:IFI=""THEN970ELSEIFI=CHR$(
13)THEN980ELSE970
980 GOSUB1990:PRINT@1,"IF YOU HAVE A NU
MERIC KEYPAD, USE THE KEYS NOT IN PAR
ENTHESIS.";
990 PRINT@66,"IF YOU DO NOT, USE: 7, 8
AND 9 PLUS THE KEYS IN PARENTHESIS.";

1000 PRINT@132,"YOU DO NOT HAVE TO PRES
S ENTER AT ALL AFTER THE GAME BE-";
1010 PRINT@197,"GINS. PLUG THE AUX PLU
G OF YOUR COMPUTER INTO A SMALL";
1020 PRINT@263,"AMPLIFIER TO GET SOUND.
PRESS ENTER.";
1030 PRINT@594,"7";:PRINT@607,"8";:PRIN
T@621,"9";:PRINT@780,"4(OR U)";:PRINT
@796,"5(OR I)";:PRINT@813,"6(OR O)";:
PRINT@906,"1(OR J)";:PRINT@924,"2(OR
K)";:PRINT@943,"3(OR L)";
80-U.S. Journal Jul/Aug 1981

```

# LABYRINTH!

Labyrinth is not easy. Waking a sleeping watch-dragon is the least of your troubles. Somewhere in this nightmare of tunnels lurks an evil minotaur. To escape, you must kill it. And survive.

Only the legendary light sabre of Dnev can kill the minotaur. It is secreted away in stygian darkness. To get it, you must deal with cave bears, gnomes, pits, wraiths, and much more. You must avoid the minotaur at all costs.

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Labyrinth features the full screen 3-D perspective graphic displays that have made Asylum and Deathmaze 5000 best sellers. You can actually see what you are doing and where you are going! The mazes and buildings are bit-coded. This allows us to store **gigantic** mazes in small amounts of memory. These programs are **not** just a series of stored pictures. Our mazes typically contain **over 600 locations**. Further, machine-language programming gives instantaneous graphics generation and game response!

**LABYRINTH** places you in a huge maze of tunnels inhabited by gnomes, ghosts, witches, and an evil minotaur. You must find the weapons and treasures needed to destroy the minotaur before he destroys you! There is food enough in the maze to hold out for months!

TRS-80 Level II 16K or Model III 16K \$12.95

**ASYLUM** places you on a cot in a small room. Periodically, a janitor lobbs a hand-grenade through the window of your locked door. What you do next could mean survival and escape! It could also mean permanent residence in the home for Deathmaze survivors! To leave, you will have to deal with guards, fellow survivors, doctors, the infamous Crazy Carpenter, and much, much more. Don't expect to get out any time soon! There are over 1200 locations!

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**DEATHMAZE 5000** places you in a gigantic five-story building. There is only one goal. **ESCAPE ALIVE!** Monsters, dogs, vampires, and other vile horrors will plague your every step as you struggle to survive one of the most challenging adventures ever written. As of December 20, only two people outside the Med Systems' staff were known to have escaped!

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Circle 21

## Med Systems Software

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Fun & Games

```

1040 I=INKEY$:IFI=""THEN1040ELSEIFI=CHR
$(13)THEN1060ELSE1040
1050 REM * NUMBER OF SUNS? *
1060 PRINT@448,"
";:GOSUB1990:PRINT@448,"NUMBER OF S
UNS?";
1070 I=INKEY$:IFI=""ORI<"2"ORI>"4"THEN1
070
1080 A3=VAL(I):PRINT@448,"
";:GOSUB1990:GOSUB2030:S=CHR$(32)+C
HR$(10)+CHR$(32)+CHR$(50)
1090 REM * START MAIN LOOP *
1100 PRINT@448,":PRINTUSINGR1;A1;:PRINT
@502,":PRINTUSINGR2;A4,A2;
1110 IFB(1)=0THEN1140
1120 PRINT@P1,CHR$(Q1);:IFP1=402THEN01=
64:X=USR(VARPTR(SO))ELSEIFP1=594THEN0
1=-64:X=USR(VARPTR(SO))
1130 P1=P1+01:Q1=PEEK(15360+P1):PRINT@P
1,"*";
1140 IFB(2)=0THEN1170
1150 PRINT@P2,CHR$(Q2);:IFP2=414THEN02=
64:X=USR(VARPTR(SO))ELSEIFP2=606THEN0
2=-64:X=USR(VARPTR(SO))
1160 P2=P2+02:Q2=PEEK(15360+P2):PRINT@P
2,"*";
1170 IFB(3)=0THEN1200
1180 PRINT@P3,CHR$(Q3);:IFP3=429THEN03=
64:X=USR(VARPTR(SO))ELSEIFP3=621THEN0
3=-64:X=USR(VARPTR(SO))

1190 P3=P3+03:Q3=PEEK(15360+P3):PRINT@P
3,"*";
1200 IFB(4)=0THEN1230
1210 PRINT@P4,CHR$(Q4);:IFP4=207THEN04=
64:X=USR(VARPTR(SO))ELSEIFP4=783THEN0
4=-64:X=USR(VARPTR(SO))
1220 P4=P4+04:Q4=PEEK(15360+P4):PRINT@P
4,"*";
1230 IFB(5)=0THEN1260
1240 PRINT@P5,CHR$(Q5);:IFP5=223THEN05=
64:X=USR(VARPTR(SO))ELSEIFP5=799THEN0
5=-64:X=USR(VARPTR(SO))
1250 P5=P5+05:Q5=PEEK(15360+P5):PRINT@P
5,"*";
1260 IFB(6)=0THEN1290
1270 PRINT@P6,CHR$(Q6);:IFP6=240THEN06=
64:X=USR(VARPTR(SO))ELSEIFP6=816THEN0
6=-64:X=USR(VARPTR(SO))
1280 P6=P6+06:Q6=PEEK(15360+P6):PRINT@P
6,"*";
1290 IFB(7)=0THEN1320
1300 PRINT@P7,CHR$(Q7);:IFP7=77THEN07=6
4:X=USR(VARPTR(SO))ELSEIFP7=909THEN07
=-64:X=USR(VARPTR(SO))

```

```

1310 P7=P7+07:Q7=PEEK(15360+P7):PRINT@P
7,"*";
1320 IFB(8)=0THEN1350
1330 PRINT@P8,CHR$(Q8);:IFP8=96THEN08=6
4:X=USR(VARPTR(SO))ELSEIFP8=928THEN08
=-64:X=USR(VARPTR(SO))
1340 P8=P8+08:Q8=PEEK(15360+P8):PRINT@P
8,"*";
1350 IFB(9)=0THEN1390
1360 PRINT@P9,CHR$(Q9);:IFP9=114THEN09=
64:X=USR(VARPTR(SO))ELSEIFP9=946THEN0
9=-64:X=USR(VARPTR(SO))
1370 P9=P9+09:Q9=PEEK(15360+P9):PRINT@P
9,"*";
1380 REM * SCAN KEYBOARD FOR PRESSED KE
Y *
1390 IFPEEK(14352)=128THEN1620
1400 IFPEEK(14368)=1THEN1660
1410 IFPEEK(14368)=2THEN1700
1420 IFPEEK(14352)=160RPEEK(14342)=32TH
EN1740
1430 IFPEEK(14352)=320RPEEK(14338)=2THE
N1780
1440 IFPEEK(14352)=640RPEEK(14338)=128T
HEN1820
1450 IFPEEK(14352)=20RPEEK(14338)=4THEN
1860
1460 IFPEEK(14352)=40RPEEK(14338)=8THEN
1900
1470 IFPEEK(14352)=80RPEEK(14338)=16THE
N1940
1480 IFA5=0THEN1590
1490 A5=0:GOSUB2010
1500 IFQ1=191THENQ1=128
1510 IFQ2=191THENQ2=128
1520 IFQ3=191THENQ3=128
1530 IFQ4=191THENQ4=128
1540 IFQ5=191THENQ5=128
1550 IFQ6=191THENQ6=128
1560 IFQ7=191THENQ7=128
1570 IFQ8=191THENQ8=128
1580 IFQ9=191THENQ9=128
1590 C1=C1-.5:A2=FIX(C1):IFA2=0ANDA4=0T
HEN2090ELSEIFA2=-1THENA2=59:C1=59.5:A
4=A4-1
1600 GOT01100
1610 REM * ROUTINES FOR CATCHING SUN *
1620 IFA5<>1THENX=USR(VARPTR(S1)):GOSUB
2010
1630 A5=1:PRINT@586,H(1,1);:PRINT@648,H
(1,2);
1640 IFP1=594THENX=USR(VARPTR(S)):A1=A1
+1:PRINT@P1,CHR$(Q1);:B(1)=0:P1=402:Q
1=128:GOSUB2050
1650 GOT01590

```

# THE PROGRAMMER'S GUILD MEANS ADVENTURE

## THUNDER ROAD ADVENTURE

It is late in the evening. The moon has just risen over the top of the mountain. Grandpa McKee has just loaded the last jug of White Lightning into the car. Everything is ready. Then as if on cue, the RIDGERUNNER appears. He is cool, confident, as he slides behind the wheel of the fuel injected '57 Chevy. He cranks the engine and it leaps into life with a throaty roar, 427 cubic inches of raw horsepower. Grandpa McKee hands him the destination slip. It says, simply KNAWBONE. A thin smile comes over the RIDGERUNNER'S face. KNAWBONE is Sheriff Bubba Clemmons' territory. There would be a lot of action tonight. He flips the Hurst shifter into low gear and powers away in a hail of dust and a shower of stones. Grandpa McKee shakes his head. The boy will be in for a rough time tonight, of all the routes in these hills this one is the toughest. That's why they call it --- **THUNDER ROAD!**

**THUNDER ROAD ADVENTURE** is so real you almost expect to see Burt Reynolds cruise by in a black Firebird. The RIDGERUNNER is your eyes and ears as you maneuver the country roads around Hazzard county. There are Revenooors, hungry bears, a good looking lady hitchiker, treacherous roads, burned out bridges, roadblocks and puzzles to solve before you can deliver your cargo of pure Kentucky Corn to the thirsty old Boys in KNAWBONE. Can you dodge the long arm of the law, and all the pitfalls of Hazzard County? Or will you wind up in Sheriff Bubba's pokey? **THUNDER ROAD ADVENTURE** is classic adventure style for **ADVENTURE** fans of all ages.

Tape \$14.95    Disk \$19.95

## DEATH DREADNAUGHT

This mind chilling thriller will freeze the blood in your veins. You are trapped aboard an ancient alien battlecruiser whose entire crew was murdered brutally. You are the scout team's only survivor. Your ship's been smashed, but one alien shuttlecraft remains intact. As you move about the wreck the danger increases. You must secure air, food, fuel and batteries. Now, as precious seconds of your life tick away, you suddenly realize YOU ARE NOT ALONE! The creature that ripped this ship apart is ALIVE and waiting for you to make a mistake. CAN YOU ESCAPE? Or will YOU be the creature's next victim?

**WARNING: DEATH DREADNAUGHT IS RATED R** due to EXTREME descriptions of VIOLENCE!

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## SPIDER MOUNTAIN ADVENTURE

Beyond the desolate outback of GRAYLOCKLAND lies the lair of the spider SHELOB. Once a wizard's cavernous fortress. SPIDER MOUNTAIN is now a deadly trap from which only the most skilled adventurers emerge. Treasure awaits the fortunate. DEATH stalks the foolish.

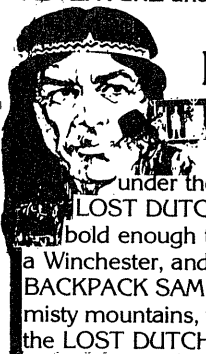
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## LOST DUTCHMAN'S GOLD\*

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Deep in Arizona's Superstition mountains, under the watchful eye of Apache Indians, the fabled LOST DUTCHMAN'S GOLD MINE awaits the adventurer bold enough to challenge the fates. With only a mule and a Winchester, and the ghost of an old gold prospector named BACKPACK SAM to guide you, do you dare to venture into the misty mountains, where it is said that the Devil himself, protects the LOST DUTCHMAN'S GOLD?

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# The Programmers' Guild

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Circle 30

SEND CHECK OR M/O (SHIPMENT WITHIN FIVE DAYS OF RECEIPT) C.O.D. ACCEPTED

## Fun & Games

```

1660 IFA5<>2THENX=USR(VARPTR(S2)):GOSUB
    2010
1670 A5=2:PRINT@601,H(2,1);:PRINT@664,H
    (2,2);
1680 IFP2=606THENX=USR(VARPTR(S)):A1=A1
    +1:PRINT@P2,CHR$(Q2);:B(2)=0:P2=414:Q
    2=128:GOSUB2050
1690 GOT01590
1700 IFA5<>3THENX=USR(VARPTR(S3)):GOSUB
    2010
1710 A5=3:PRINT@614,H(3,1);:PRINT@679,H
    (3,2);
1720 IFP3=621THENX=USR(VARPTR(S)):A1=A1
    +1:PRINT@P3,CHR$(Q3);:B(3)=0:P3=429:Q
    3=128:GOSUB2050
1730 GOT01590
1740 IFA5<>4THENX=USR(VARPTR(S4)):GOSUB
    2010
1750 A5=4:PRINT@711,H(4,1);:PRINT@773,H
    (4,2);
1760 IFP4=783THENX=USR(VARPTR(S)):A1=A1
    +1:PRINT@P4,CHR$(Q4);:B(4)=0:P4=207:Q
    4=128:GOSUB2050
1770 GOT01590
1780 IFA5<>5THENX=USR(VARPTR(S5)):GOSUB
    2010
1790 A5=5:PRINT@728,H(5,1);:PRINT@791,H
    (5,2);
1800 IFP5=799THENX=USR(VARPTR(S)):A1=A1
    +1:PRINT@P5,CHR$(Q5);:B(5)=0:P5=223:Q
    5=128:GOSUB2050
1810 GOT01590
1820 IFA5<>6THENX=USR(VARPTR(S6)):GOSUB
    2010
1830 A5=6:PRINT@743,H(6,1);:PRINT@808,H
    (6,2);
1840 IFP6=816THENX=USR(VARPTR(S)):A1=A1
    +1:PRINT@P6,CHR$(Q6);:B(6)=0:P6=240:Q
    6=128:GOSUB2050
1850 GOT01590
1860 IFA5<>7THENX=USR(VARPTR(S7)):GOSUB
    2010
1870 A5=7:PRINT@836,H(7,1);:PRINT@898,H
    (7,2);:PRINT@961,H(7,3);
1880 IFP7=909THENX=USR(VARPTR(S)):A1=A1
    +1:PRINT@P7,CHR$(Q7);:B(7)=0:P7=77:Q7
    =128:GOSUB2050
1890 GOT01590
1900 IFA5<>8THENX=USR(VARPTR(S8)):GOSUB
    2010
1910 A5=8:PRINT@855,H(8,1);:PRINT@918,H
    (8,2);:PRINT@982,H(8,3);
1920 IFP8=928THENX=USR(VARPTR(S)):A1=A1
    +1:PRINT@P8,CHR$(Q8);:B(8)=0:P8=96:Q8
    =128:GOSUB2050
1930 GOT01590
1940 IFA5<>9THENX=USR(VARPTR(S9)):GOSUB
    2010
1950 A5=9:PRINT@872,H(9,1);:PRINT@937,H
    (9,2);:PRINT@1001,H(9,3);
1960 IFP9=946THENX=USR(VARPTR(S)):A1=A1
    +1:PRINT@P9,CHR$(Q9);:B(9)=0:P9=114:Q
    9=128:GOSUB2050
1970 GOT01590
1980 REM * PRINT UPPER GRID *
1990 PRINT@1,U1;:PRINT@66,U2;:PRINT@132
    ,U3;:PRINT@197,U4;:PRINT@263,U5;:PRIN
    T@328,U6;:PRINT@394,U7;:PRINT@459,U8;

2000 REM * PRINT LOWER GRID *
2010 PRINT@523,D1;:PRINT@586,D2;:PRINT@
    648,D3;:PRINT@711,D4;:PRINT@773,D5;:P
    RINT@836,D6;:PRINT@898,D7;:PRINT@961,
    D8;:RETURN
2020 REM * SELECT SUN LOCATION *
2030 FORN1=1TO9:B(N1)=0:NEXTN1
2040 FORN1=1TOA3:B(RND(9))=1:NEXTN1
2050 N2=0:FORN1=1TO9:N2=N2+B(N1):NEXTN1

2060 IFN2<>A3THENB(RND(9))=1:GOTO2050
2070 RETURN
2080 REM * PRINT SCORE, RATING, AND COM
    MENTS *
2090 CLS:PRINT@26,"* SUNDANCE *";
2100 PRINT@128,"YOU SCORED";A1;"WITH";A
    3;"SUNS RUNNING AT THE SAME TIME.";
2110 PRINT@192,"ON A SCALE OF 0 TO 100
    THAT RATES:";STR$(INT((A1*100)/(A3*40
    )));".";
2120 ONINT(((A1*100)/(A3*40))/10)GOTO21
    40,2150,2160,2170,2180,2190,2200,2210
    ,2220,2230
2130 G="BURRRP!":GOTO2240
2140 G="NOT TOPS.":GOTO2240
2150 G="I'VE SEEN BETTER.":GOTO2240
2160 G="MINOR LEAGUE.":GOTO2240
2170 G="ACCEPTABLE.":GOTO2240
2180 G="MEDIocre.":GOTO2240
2190 G="RESPECTABLE.":GOTO2240
2200 G="OK FOR A HUMAN.":GOTO2240
2210 G="WORTHY OPPONENT.":GOTO2240
2220 G="GIVE THAT MAN A CIGAR!":GOTO224
    0
2230 G="NO COMMENT."
2240 PRINT@256,G;
2250 REM * PLAY AGAIN? *
2260 PRINT@320,"WOULD YOU LIKE TO PLAY
    SUNDANCE AGAIN?";
2270 I=INKEY$:IFI=""THEN2270ELSEIFI="Y"
    THENPRINT@384,"OK FINE.":RUNELSEIFI=
    "N"THENPRINT@384,"PARTY POOPER.":END
    ELSE2270

```



## Listing 2

TRS-80 32K Disk Basic Model I/III

Replacement program lines for the 16K Tape version

```

30 REM * DON'T FORGET TO SET MEMORY SIZ
  E AT 45000! *
760 RESTORE:FORN1=-20535T0-20469:READN2
  :POKEN1,N2:NEXTN1
770 IFPEEK(16396)=201THENPOKE16526,0:PO
  KE16527,191ELSEDEFUSR=-20535:CMD"T"

```

## Listing 3

TRS-80 16K Extended Basic Color Computer

```

10 REM * SUNDANCE *
20 REM * VERSION 4.1 COLOR
30 REM * COPYRIGHT 1980
40 REM * JON A. WAPLES
50 GOTO140
60 IF P(I)<=U(I) THEN F(I)=D ELS
  E IF P(I)>=L(I) THEN F(I)=-D
70 LINE(X(I),P(I))-(X(I)+6,P(I)+
  10),PSET,BF
80 IF F(I)<0 THEN120
90 LINE(X(I),P(I))-(X(I)+6,P(I)+
  4),PRESET,BF
100 P(I)=P(I)+F(I)
110 RETURN
120 LINE(X(I),P(I)+10)-(X(I)+6,P
  (I)+6),PRESET,BF
130 GOTO100
140 CLEAR
150 PCLEAR4
160 AA$="03;T9;D;P255;D;P255;D;T
  3;L2;G;04;D"
170 BB$="T9;L4;C;03;B;A;T3;L2;04
  ;G;L4;D;"
180 CC$="03;P4;L8.;D;L16;P166;D;
  L2;G;04;D"
190 DD$="T9;L4;C;03;B;04;C;T3;L2
  ;03;A;"
200 E$="XAA$;XBB$;XBB$;XDD$;XCC$
  ;XBB$;XBB$;XDD$;"
210 CLS3
220 PCLS3:Pmode3,1:SCREEN1,0:COL
  OR2,3
230 FORA=0 TO .96 STEP .01
240 CIRCLE(128,96),50,2,A
250 NEXTA
260 A4=2:C1=30.5:SC=0
270 D=5
280 FORI=1T03:P(I)=64:U(I)=64:L(I)
  =116:NEXTI
290 FORI=4T06:P(I)=38:U(I)=P(I):
  L(I)=143:NEXTI

```

Circle 60

## Color Computer News

**Color Computer News** is the first and only magazine devoted to the users of Radio Shack's Color Computer. **Color Computer News** allows CC users to have a source of information about their machine plus forums for the exchange of ideas, discoveries, helps, and complaints. **CCN** is published every other month and contains features like 6809 Assembler programming, Novice Basic, Advanced Basic, Letters and Technical Forums. **CCN** reviews current products for the Color Computer and tells the truth about them, good or bad.

It's not just a beginner's magazine either, it prints what old hacker's need to know too. Things like entry points to the ROM and pointers in the Basic scratchpad.

**Color Computer News** is more than just a magazine, it's also a software-exchange service. Color Computer owners can exchange original software by contributing it to the **CCN** library where several of these programs are put on a tape and distributed for a nominal fee. **CCN** is also a nationwide User's Group. **CCN** helps establish local User's Groups with form letters, posters, names and publicity.

If you own a Color Computer you need a subscription to **Color Computer News**. While the other magazines will print some articles about the Color Computer you need a constant source of information to stay abreast of what's happening with the Color Computer.

A charter subscription to Color Computer News is just \$9.00 for 6 issues. But you'd better hurry, you don't want to miss a single issue.

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Circle 8

Introducing ...

# OMNITERM

The Ultimate TRS-80™ Terminal Package ... At Last!

**OMNITERM** - The Ultimate TRS-80™ Terminal Package is now available after nearly 2 years in the making. Created as a result of dissatisfaction with existing terminal programs, **OMNITERM** is the Most Powerful and Flexible microcomputer intelligent terminal program at any price - Bar None. Now the TRS-80™ can communicate with and transfer files to almost any computer system without writing special software. **OMNITERM** solves the problem of computer systems that send 32, 40, or 80 column lines to your 64 column TRS-80™ by reformating your screen for easy reading. **OMNITERM** can compensate for incompatibilities with 7 different translation tables, one to and from each device. This capability even allows **OMNITERM** to use codes such as EBCDIC, and translate them to the TRS-80™'s ASCII. With **OMNITERM** you can even review text that has scrolled off the screen! At any time you can examine and change any of **OMNITERM**'s settings, because **OMNITERM** gives you a Full Status Display of all functions. It works with all ROM's and DOS's since it uses only officially documented calls.

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- True Break Key
- X/Y Cursor Control
- Xen/Xoff File Control!
- Repeat Key
- Lower Case Support.
- Can Echo characters
- Sends Special Characters not on the TRS-80 keyboard
- Control-G causes "Beep" sound and Graphic Bell to flash on the screen.
- Accepts all standard VIDEOTEX™ control codes.
- Can configure the UART for baud rates from 50-19,200 baud.
- Can send text Slowly for computers that work at "typist" speed.
- Keeps continuous count of Parity, Framing, and Overrun errors.
- Saves a special file with proper settings for each different use.
- Includes: 75 page manual, Text Editor, Hex Conversion Utilities.

Everyone who sees **OMNITERM** is Amazed by its Power and Ease of Use! Requires TRS-80 Model I or III with 32K memory, 1 disk. \$95 (plus shipping if C.O.D.). Call for shipment within 24 hours. Manual alone \$15, refunded with purchase. Visa, M/C, and C.O.D. accepted. Mass. residents add 5% sales tax. Dealer Inquiries Invited.

## Lindbergh Systems

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```

300 FORI=7TO9:P(I)=12:U(I)=P(I):
L(I)=168:NEXTI
310 X(7)=53:X(8)=122:X(9)=195:
X(4)=56:X(5)=122:X(6)=190:
X(1)=59:X(2)=122:X(3)=185
320 SC$="S8;BM0,0;D1D1F1R3F1D2G1
L3H1BU5E1R3F1BD6;BM-5,+2;D1D5F1R
3E1U1BU3U1H1L3G1BD6BR5BM-5,+2;D1
D5F1R3E1U5H1L3G1BD6BR5BM-5,+2;ND
7R4F1D1G1NL4F1D3BM-6,+2;NR5D3NR4
D4R5"
330 TI$="S8;BM247,0;R4L2D7BD2R2L
4R2D7L2R4BD2ND7L2ND4L2D7BD2NR5D3
NR3D4R5"
340 DRAW"S15C2;BM40,160;BD1DF1R3
F1D2G1L3H1BU5E1R3F1;S8;BD6BM+6,-
2;D5F2R1E2U5D7BM+6,-7;D7U5E2R1F2
D5"
350 DRAW"S8;BM+8,-7;G2D3F2R2E2D2
U14D8H1L2;BM+10,2;E2R1F2D5R1L1U3
H1L2G2F2R2E1"
360 DRAW"S8;BM+6,1;U7D2E2R1F2D5;
BM+10,-5;H2L1G2D3F2R1E2;BM+5,-2;
R5U1H2L2G2D3F2R2E2"
370 PLAY E$
380 SCREEN0,1
390 PRINT@320," A JON WAPLES
PRODUCTION"
400 PRINT" COPYRIGHT 198
0"
410 PRINT" DO YOU WANT INSTRUC
TIONS?"
420 A$=INKEY$:IF A$="" THEN 420
430 IF A$="Y" THEN 460
440 IF A$="N" THEN 490
450 GOTO 420
460 CLS:PRINT"SUNDANCE IS A EASY
GAME. IT CONSISTS OF 2 T
O 4 SUNS WHICH BOUNCE BETWE
EN 2 3X3 GRIDS VIEWED IN PE
RSPECTIVE."
470 PRINT"THE OBJECTIVE OF THE G
AME IS TO CATCH AS MANY SU
NS AS POSSIBLE. TO DO THI
S YOU MUST OPEN ONE OUT
OF"
480 PRINT"NINE LOWER GRIDS. USE
THE KEYS 1, 2, OR 3 TO OPE
N THE FURTHEST THREE GR
IDS; 4, 5, OR 6 FOR THE MID
DL E THREE; AND 7, 8, OR 9
FOR THE CLOSEST THREE.
490 PRINT:PRINT" ENTER THE NUMBE
R OF SUNS (2-4)";
500 A$=INKEY$:IF A$="" OR A$<"2" OR

```

```

$>"4" THEN 500
510 A3=VAL(A$)
520 GOSUB 670:GOSUB 860
530 DRAW SC$:DRAW TI$
540 LINE(247,88)-(247,88+(2*C1))
,PSET
550 CIRCLE(16,130),12,4:PAINT(16
,130),4,4:CIRCLE(14,130),7,1,3,.
15,.85
560 FORI=9TO1STEP-1
570 IF B(I)=1 THEN GOSUB 60
580 NEXT I
590 GOSUB 780
600 A$=INKEY$ : IF A$="" THEN 63
0
610 V=VAL(A$) : IF V=0 THEN 630
620 GOSUB 910
630 C1=C1-.1:A2=INT(C1):IFA2=OTH
EN118U
640 LINE(247,88)-(247,88+(61-(2*
C1))),PRESET
650 GOTO 560
660 REM ** DRAW GRID **
670 PCLS:SCREEN1,0
680 LINE(42,82)-(12,4),PSET
690 LINE(42,109)-(12,187),PSET
700 LINE(12,187)-(243,187),PSET
710 LINE(243,187)-(213,109),PSET
720 LINE(213,82)-(243,4),PSET
730 LINE(243,4)-(12,4),PSET
740 LINE(89,4)-(99,82),PSET
750 LINE(166,4)-(156,82),PSET
760 LINE(89,187)-(99,109),PSET
770 LINE(166,187)-(156,109),PSET
780 LINE(22,30)-(232,30),PSET
790 LINE(22,161)-(232,161),PSET
800 LINE(32,56)-(222,56),PSET
810 LINE(32,135)-(222,135),PSET
820 LINE(42,82)-(212,82),PSET
830 LINE(42,109)-(212,109),PSET
840 RETURN
850 REM *SELECT SUN LOCATION*
860 FOR N1= 1TO9 : B(N1)=0 : NEX
T N1
870 FOR N1 =1TO A3 : B(RND(9))=1
: NEXT N1
880 N2=0 : FOR N1 = 1 TO 9 : N2=
N2+(B(N1)):NEXTN1
890 IF N2<>A3 THEN B(RND(9))=1 :
GOTO 880
900 RETURN
910 IF V<4 THEN V1=110 ELSE IF V
>6 THEN V1=162 ELSE V1=136
920 IF V/3=INT(V/3) THEN V2=195
ELSE IF (V-1)/3=INT((V-1)/3) THE

```

```

N V2=44 ELSE V2=122
930 PAINT (V2,V1),4,2
940 IF P(V)<L(V) THEN PAINT (V2,
V1),3,2 : SOUND 1,1 : RETURN
950 LINE(X(V),P(V))-(X(V)+6,P(V)
+10),PRESET,BF
960 PLAY A$
970 B(V)=0
980 IFV<4THENP(V)=64ELSEIFV>6THE
NP(V)=12ELSEP(V)=38
990 PAINT(V2,V1),3,2
1000 S1=S1+1 : IF S1>9 THEN S1=0
: S2=S2+1
1010 GOSUB1040
1020 GOSUB 880
1030 RETURN
1040 LINE(10,88)-(40,105),PRESET
,BF: DRAW"BM10,88;"
1050 SX=S2:GOSUB1060: SX=S1: DRAW"
BM25,88;"
1060 ONSX+1GOSUB1080,1090,1100,1
110,1120,1130,1140,1150,1160,117
0
1070 RETURN
1080 DRAW"BD1D5F1R3E1U5H1L3G1BD6
BR5":RETURN
1090 DRAW"BR4D7":RETURN
1100 DRAW"BD1E1R3F1D2G1L3G1D2R4"
:RETURN
1110 DRAW"BD1E1R3F1D1G1NL3F1D2G1
L3H1":RETURN
1120 DRAW"D4R3U4D7U3R2":RETURN
1130 DRAW"NR5D4R4F1D1G1L3H1":RET
URN
1140 DRAW"BR5BD2U1H1L3G1D5F1R3E1
U1H1L3G1":RETURN
1150 DRAW"R5D1G1D1G1D1G1D1":RETU
RN
1160 DRAW"BD1E1R3F1D1G1L3G1D2F1R
3E1U2H1L3H1U1":RETURN
1170 DRAW"BD3BR4L3H1U1E1R3F1D1G5
":RETURN
1180 CLS:PRINT@12,"SUNDANCE";
1190 PRINT@65,"YOU SCORED";
1200 SC=S2*10+S1
1210 PRINTSC
1220 PRINT" WITH"A3"SUNS RUNNING
":PRINT" AT THE SAME TIME.
1230 PRINT:PRINT" THAT RATES A:
";
1240 RT=INT((SC*100)/(A3*40))
1250 PRINT RT
1260 PRINT
1270 PRINT"PLAY AGAIN?";
1280 A$=INKEY$: IF A$="" THEN1280
1290 IF A$="Y" THENRUNELSEEND

```

Circle 54

## STOP PLAYING GAMES!

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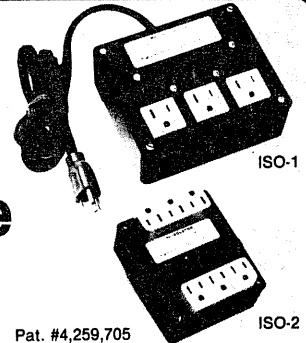
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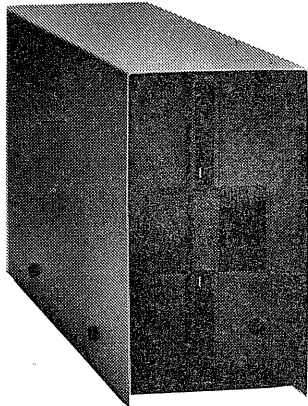
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Access Unlimited								
AFD-100 <sup>1</sup>	\$295.00	no	180 Kbytes	102 Kbytes	yes	yes	yes	yes
AFD-100F <sup>1</sup>	\$329.00	yes	360 Kbytes	204 Kbytes	yes	yes	yes	yes
MTI								
TF-5	\$359.00	no	?	?	?	?	?	no
Midwest Comp. & Per								
MPI B-51	\$321.00	no	?	102 Kbytes	?	?	yes	no
Aerocomp								
Mdl 40-1	\$349.95	yes	?	?	yes	?	yes	yes
CPU Shop								
CCI-100	\$314.00	no	?	102 Kbytes	?	?	yes	no
AMI								
40-track	\$325.00	no	?	?	?	?	?	no
<b>80-TRACK DRIVES</b>								
Access Unlimited								
AFD-200 <sup>1</sup>	\$429.95	no	368 Kbytes	205 Kbytes	yes	yes	yes	yes
AFD-200F <sup>1</sup>	\$449.95	yes	736 Kbytes	410 Kbytes	yes	yes	yes	yes
MTI								
TF-8	\$639.00	no	?	200 Kbytes	?	?	?	no
Aerocomp								
80-tk mdl	\$459.95	yes	?	?	yes	?	yes	yes
CPU Shop								
CCI-280	\$429.00	no	?	204 Kbytes	?	?	yes	no
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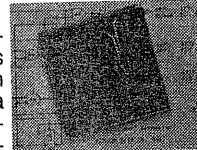
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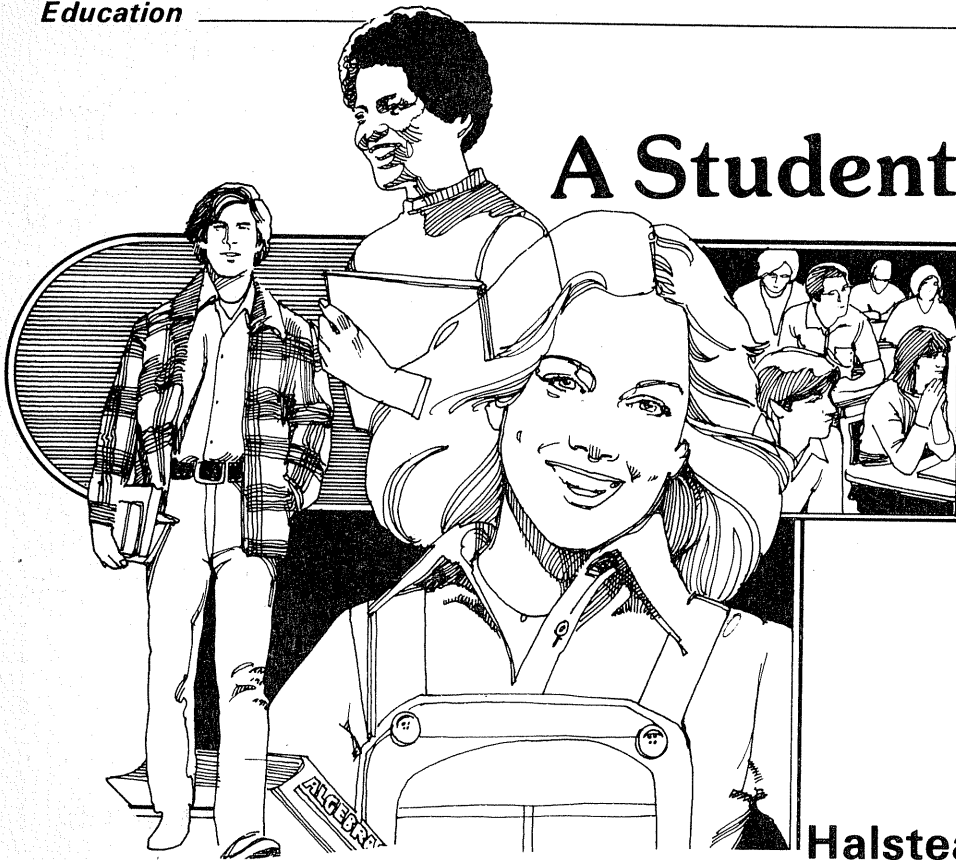
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# A Student Timetable

## (Schedule)

## Printer

TRS-80 Model I

Ian Sinclair

Halstead, Essex, England

For me, September comes around a little too quickly each year when my College enrolls its hundreds of students. They appear apparently from nowhere and are anxious to enroll in one of the many courses which we offer.

Like most Colleges in this district of England which operate educational schemes for the age group 16 to 60 (and beyond), we work on a "block" schedule system. The block system arranges subjects in groups, or blocks as illustrated in Figure 1. A student can then select up to five subjects to make up a course, taking one from each block. Provided that no one wants to take two subjects from the same block, the structure of the blocks then insures that any course which is selected in this way can be organized, with rooms and instructors planned in advance.

The block system was a great improvement on previous methods, which alternated between a very restricted choice of a few courses (simple to organize, but little choice for the student) and a "cafeteria system", in which students could pick almost any combination of subjects (plenty of choice, but difficult to organize, with the chance that a large number of students would have to be told later than the course they have chosen was not available). The only hitch in the block system is that of writing a schedule for each student. In the years before Tandy, this was done the hard way. An admissions officer would consult with each student and prepare a list which showed each subject and its block number. The student would then go see his class

counselor, who would write out an individual schedule on the basis of the subjects, block numbers, and block schedule, which showed when each block of subjects could be taught (see Figure 2).

This year the TRS-80 which has replaced our mainframe computer did the dirty work. Students with a list of their subjects and block numbers lined up and had their schedules printed by the TRS-80. Results were shorter lines, quicker turnover, less frustration and more time for counselors to concentrate on student needs rather than on the mechanical business of writing out a schedule in a hurry.

The key to all this serenity was the program accompanying this article. The program allows a block diagram to be created on the video screen and recorded, so that several different sets can be used. With a given block diagram in use, student schedules can be printed in duplicate when subjects and the corresponding block numbers are fed in. An example of a schedule in this way is shown in Figure 3. The subjects are denoted by four letter abbreviations with space left for room numbers when they are scheduled (I'm working on that one - it's more an organizational problem than a programming problem). The exclamation marks are used as vertical dividers because the only printer which was available on enrollment day (and which could be easily moved) was one which lacked graphics capabilities.

### The Program

I never put REM statements into programs. I regard the use of REMs as an

inferior way of documenting a program. My practice is to keep a full record of the aims of the program, its developmental stages, and a line-by-line account of how it operates. This makes more paperwork, but is very much better than a string of REMs for understanding the flow of the program. The description of the program which follows is taken from those records.

The program starts on line 5 with the CLEAR to provide string space, and the definition of integer variables. In my own version, lines 1 through 4 contain READ, POKE and DATA statements which load a machine-code program into high memory so that the serial printer can be driven from the TRS-80 cassette port. I have omitted these lines in this listing, because they are needed only if the hardware demands them. The only arrays which are used are dimensioned in line 7.

Line 8 offers the option for seeing instructions. The question is answered by typing YES or NO with no need to hit enter. The subroutine in line 1100 uses INKEY\$ to accomplish this. The subroutine for the instructions is found in lines 500 and 510. Following the appearance of the instructions, a flashing asterisk (called the *flashterisk*) acts as a prompt. Pressing any key, other than BREAK, will allow the program to proceed. The flashterisk routine (in line 1000) is used in several places in this and other of my programs. Where hardcopy is called for, pressing the "P" key when the asterisk flashes will start a printout, while any other key will bypass this step. This allows me to go quickly through a program to try out new ideas without waiting for a printer.

**Figure 1  
0 Level Blocks**

Block 1	Block 2	Block 3	Block 4	Block 5	Block 6
Math	Biology	Math	Phycs	Tech Dwg	Chemistry
Statistics	Physics	English	Geography	Math	Computing
Food & Nutr	English Lit	Chemistry	French	English	Biology
English	Env Studies	Human Bio	English	German	Sociology
Economics	History	Commerce	English	----	English Lit

**Figure 2 — Sample Block Schedule  
Lower Cert.**

	Periods							
	1	2	3	4	5	6	7	8
MON	3	6	6		5	5	1	4
TUE	6	2	2		2	1	1	9
WED	7	7	4		3	3	8	8
THU	5	5	5		2	2	4	6
FRI	4	4	1		3	3	6	1

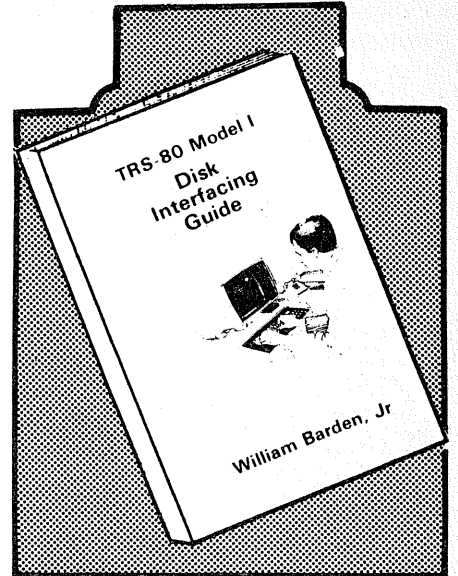


**Figure 3 — Sample Student Timetable Printout**

Benny Hill GEN-1

	1	2	3	4	5	6	7	8
MON	CHEM				MATH	MATH	ENGL	GEOG
TUE		PHYS	PHYS		PHYS	ENGL	ENGL	
WED			GEOG		CHEM	CHEM		
THU		MATH	MATH	MATH		PHYS	PHYS	GEOG
FRI		GEOG	GEOG	ENGL		CHEM	CHEM	ENGL

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Circle 59

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## Education

```

5 CLEAR4000:DEFINTI,J,N,P,Q,R,X-Z:DEFST
RA-H,K-M,S-W
7 DIM B(41),S(30),H(30,9)
8 CLS:PRINTTAB(5)"NEED INSTRUCTIONS? AN
SWER YES OR NO, DO NOT USE ENTER":GOS
UB1100:IFR=1THENGOSUB500
9 FOR N =1TO5:READ D(N):NEXT
10 CLS:PRINTCHR$(23)TAB(13)"CHOICE":PRI
NTTAB(1)"1. ENTER BLOCK TIMETABLE.":PR
INTTAB(1)"2. REPLAY BLOCK TIMETABLE.":
PRINTTAB(1)"3. CREATE TIMETABLES.":PRI
NTTAB(1)"4. END PROGRAM
20 GOSUB1000:N=VAL(K):IFN=4THENCLS:GOTO
6000:ELSEIFN>OANDN<4THENPRINTCHR$(28)
:CLS:PRINT@344,"IS PRINTER READY?":EL
SE F="INCORRECT CHOICE":GOSUB1300:GOT
O10
30 GOSUB1100:IF R=1THENPX=1ELSEPX=0
40 ON N GOTO2000,3000,4000,6000
50 CLS:PRINT@336,"DO YOU WANT TO RETURN
TO THE MENU?":GOSUB1100:IFR=1THEN10E
LSE6000
60 STOP
500 CLS:PRINTTAB(26)"INSTRUCTIONS":PRIN
T:PRINT"1. FOR CHOICE, TYPE NUMBER ON
LY, DO NOT USE ENTER.":PRINT"2. FLASH
ING ASTERISK IS A PROMPT, PRESS ANY K
EY TO PROCEED.":PRINT"3. WHERE A PRIN
TOUT IS NEEDED, PRESS 'P' WHEN ASTERI
SK FLASHES."
510 PRINT"4. USE ONLY SINGLE CHARACTERS
IN BLOCK ENTRY":PRINT"5. USE FOUR CH
ARACTERS FOR SUBJECT ABBREVIATION":GO
SUB1000:RETURN
1000 K=INKEY$:PRINTTAB(1)"*":IFK=""THE
NFORX=1TO60:NEXT:PRINTCHR$(8);:FORX=1
TO60:NEXT:GOTO1000:ELSE RETURN:RETURN
1100 A=""
1110 K=INKEY$:IFK=""THEN1110ELSEPRINTK;
:A=A+K:IFLEN(A)<2THEN1110
1120 IFLEN(A)=2ANDA="NO"THENR=2:RETURN:
ELSEIFLEN(A)=3AND A="YES"THENR=1:RETU
RN
1130 IFLEN(A)=2THEN1110ELSE F="MISTAKE"
:GOSUB1300:PRINT"YES OR NO?":GOTO1100
1200 LPRINT"":I=15360:FORNN=0TO15:FORPP
=0TO63:LPRINTCHR$(PEEK(I+64*NN+PP));:
NEXTPP:LPRINT:NEXTNN:RETURN
1300 CLS:PRINT@320,"":PRINTCHR$(23):FOR
X=1TO15:PRINTTAB((32-LEN(F))/2)F;:FOR
Z=1TO30:NEXTZ:PRINTCHR$(29);CHR$(30);
CHR$(29);:FORZ=1TO30:NEXTZ:NEXTX:CLS:
RETURN
1400 STOP
2000 CLS:INPUT"PLEASE TYPE A HEADING FO
R THIS BLOCK";L:CLS:PRINTTAB(25)L;" L
EVEL BLOCK":PRINTTAB(25)STRING$(13,61
):PRINTTAB(28)"PERIODS":PRINTTAB(5)"!

```

```

";:FORP=1TO8:PRINTTAB(7*P)P;" !";:NE
XT:PRINT:PRINTSTRING$(63,45):FORN=1TO
5
2010 PRINTD(N);:INPUT B(8*N-7),B(8*N-6)
,B(8*N-5),B(8*N-4),B(8*N-3),B(8*N-2),
B(8*N-1),B(8*N):PRINTCHR$(27);CHR$(30
);:PRINTD(N);:FORJ=1TO8:PRINTTAB(7*J-
2)"! "B(8*N-8+J);:NEXTJ
2020 PRINTTAB(61);"!":PRINT"O.K.?":GOS
UB1100:IFR=2THENPRINTCHR$(29);CHR$(27
);CHR$(30);CHR$(29);CHR$(27):GOTO2010
:ELSEPRINTCHR$(29);CHR$(30);CHR$(27):
PRINTSTRING$(63,45):NEXTN
2030 GOSUB1000:IF K="P"AND PX=1THENGOSU
B1200
2040 PRINT"THIS BLOCK WILL NOW BE RECOR
DED.PREPARE THE CASSETTE AND PRESS":P
RINT"ANY KEY WHEN READY":GOSUB1000:S=
"":FOR P=1TO40:S=S+B(P):NEXT:PRINT#-1
,L,S
2050 PRINT"DO YOU WANT TO USE THIS BLOC
K NOW?":GOSUB1100:IFR=1THEN4000ELSE E
ND
2100 DATA"MON","TUE","WED","THU","FRI"
3000 CLS:PRINTTAB(20)"REPLAY OF BLOCK D
IAGRAM":PRINT:PRINTTAB(2)"PREPARE THE
CASSETTE FOR REPLAY. PRESS ANY KEY W
HEN READY.":PRINT:GOSUB1000
3010 INPUT#-1,L,S:FORP=1TO40:B(P)=MID$(
S,P,1):NEXT:GOSUB3500:GOSUB1000:IF K=
"P" AND PX=1THEN GOSUB 1200
3020 PRINT"DO YOU WANT TO PRINT TIMETAB
LES NOW ?":GOSUB1100:IF R=2 THEN 10 E
LSE 4000
3030 STOP
3500 CLS:PRINTTAB(25)L;" LEVEL BLOCK":P
RINT:PRINTTAB(5)"!";:FOR P=1TO8:PRINT
TAB(7*P)P" !";:NEXT:PRINT:PRINTSTRIN
G$(63,45):FOR N=1TO5
3510 PRINT D(N);" !";:FOR J=1TO8:PRIN
TTAB(7*J+1)B(8*N-8+J);" !";:NEXTJ:P
RINT:PRINTSTRING$(63,45):NEXTN:RETURN
3520 STOP
4000 CLS:INPUT"TUTOR GROUP";G:INPUT"DAT
E";C:INPUT"NUMBER OF STUDENTS IN THE
GROUP";Q:FOR P=1TOQ:FORJ=1TO9:H(P,J)=
"":NEXTJ,P:FORP=1TOQ:H(P,8)="LACT":H(
P,9)="CTUT":NEXT:FOR P=1TOQ
4010 PRINTP". STUDENT'S NAME(NO COMMAS)
":INPUTS(P):PRINT"USE ENTRY OF 0,XXXX
TO TERMINATE"
4012 INPUT"BLOCK NUMBER,SUBJECT (4 CHAR
ACTERS ONLY)";I,H(P,I):IFLEN(H(P,I))<
>4THEN F="ILLEGAL ENTRY":GOSUB1300:GO
TO4012:ELSEIFI=0THENH(P,I)="" :I=0:NEX
TP:ELSE4012
4015 PRINT "READY TO PRINT ?":GOSUB 100
0:FOR P=1TOQ:Z=0
4020 LPRINT" ":LPRINT" ":LPRINTS(P);TAB

```



```

(60)G:LPRINT:LPRINTSTRING$(64,45):LPR
INTTAB(4)"!";:FORJ=1T08:LPRINTTAB(7*J
)J;" !";:NEXTJ:LPRINT:LPRINTSTRING$(
64,45)
4030 FORN=1T05:LPRINT D(N);" !";:FORJ=1
T08:IF VAL(B(8*N-8+J))<>0THENLPRINTTA
B(7*J)H(P,VAL(B(8*N-8+J)));:ELSELPRIN
TTAB(7*J)B(8*N-8+J);
4040 LPRINTTAB(7*J+5)"!";:NEXTJ:LPRINT:
LPRINTTAB(4)"!";:FOR J=1T08:LPRINTTAB
(7*J+5)"!";:NEXT:LPRINT:LPRINTSTRING$(
64,45):NEXTN:LPRINT:LPRINTC:LPRINT:L
PRINT:IF Z=0THENZ=1:GOTO4020:ELSENEXT
P
4070 PRINT:PRINT"PRESS ANY LETTER FOR N
EXT TIMETABLE, NUMBER TO RETURN TO CH
OICE":GOSUB1000:IF ASC(K)<58 AND ASC(
K)>47 THEN 10 ELSE 4000
6000 END

```

Line 9 reads the day data from the data line 2100, so that D(1)=Monday, D(2)=Tuesday, and so on.

The menu is presented in line 10. This double sized display is created by using CHR\$(23). The flashterisk prompts for a choice. If any illegal number key or letter key is pressed, line 20 will insure flashing an error message. The number chosen will be returned from the subroutine in the string variable K. If the choice is valid the prompt "PRINTER READY?" will be displayed as a reminder that this is a printer oriented program. If "YES" is answered, the variable flag PX is set, which is used later for printing. However, if "NO" is returned then no printing will take place, even if the "P" key is pressed. The print routines make no use of line printer PEEKs so that any serial or parallel printer can be used.

The string variable K is converted into an integer in line 20 and in line 40 is used to direct the program to the proper section. All sections return to line 50, which offers a return to the menu or an END. The END option is also offered in the menu. While this might look excessive, there is nothing so frustrating as having to go through a program putting dummy data in just to locate an END option!

Lines 500 through 1300 contain utility subroutines. 500-510 contain the instructions. Line 1000 is the flashterisk routine. The string variable K is set equal to the value of an INKEY\$ routine. An asterisk is printed at the TAB(1) position. If there was no key pressed, then a time delay is used to keep the asterisk on the screen. This is followed by a wipeout which uses CHR\$(8) (backspace and delete). If a key has been pressed the subroutine will then return to its calling point with the variable K containing the character pressed. If no key is pressed the routine keeps flashing the asterisk until there is some response.



Lines 1100-1130 contain a YES/NO subroutine which uses string variable A. It is cleared in line 1100. In line 1110 the string variable K is set equal to the INKEY\$ character pressed. This character is added to string A and, if A consists of only one character, the subroutine loops back to 1110 to get another character. When A consists of two characters, line 1120 will test for A="NO". The integer R is set equal to 2 if true and control returns to the main body of the program. If A="YES" then R is set to 1. Line 1130 loops the subroutine back for another character if only two characters are present other than "NO". If three characters are present, but do not make "YES", then an error message is flashed. I use this routine in most of my programs because it permits a direct YES/NO reply without using ENTER. It could be extended with a little effort, but even in its simplest form it is pleasant and convenient to use.

The routine in line 1200 is the well-established one for transferring a screen full of information to the printer and needs no further description here.

At line 1300, any message may be flashed on the screen fifteen times. The message, limited to 32 characters, is stored in the string variable F prior to calling this subroutine, and is centered by use of the TAB expression. CHR\$(29);CHR\$(30) clears the message line after a time delay to create a flashing display.

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Circle 69

The main program starts in line 2000. A routine here draws a block schedule on the screen, creates a hardcopy, and records the information. The block heading is called for and printed along with the eight period numbers spaced across the screen. (The program assumes an eight period day.) The FOR N=1 TO 5 at the end of line 2000 is the start of the loop which will print the block information.

The block information is entered through the use of an INPUT statement which calls for the list in order (using commas as delimiters) of the eight single-digit numbers. The space bar acts as a blank input. This form of the INPUT statement insures that the numbers fall correctly into an array which then can be recorded. Single digits are used because only nine blocks are needed with this method. A useful refinement would be a check for single digit entries since they are concatenated for recording. A multiple digit entry would create chaos later. This wasn't included here because there are several opportunities for checking correctness in the data before the recording step.

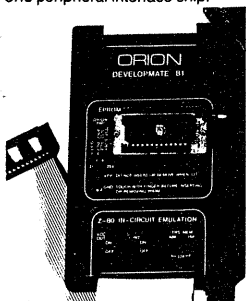
Line 2010 clears the entry line after the last item has been typed through the use of CHR\$(27);CHR\$(30). The remainder of the line prints the information in correct tabular form.

Line 2020 allows the user to check for accuracy when the "OK?" prompt appears. If "NO" is answered, the line is cleared once again for a new set of entries. If "YES"

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Circle 65

is returned, then the information is underlined. This procedure continues for each day until a complete block schedule has been created for a week.

Letters, such as S for Sports, could be used in places to print fixed information into each schedule. The printing routine will place these letters directly in the schedule.

Line 2030 gives the user an opportunity to obtain a hardcopy of the block diagram for yet another check prior to recording this information in line 2040.

The entries are concatenated into a forty-character string S for recording. Line 2050 offers the option of using the block immediately to print schedules or to return to the menu.

The subroutine at line 3000 permits the replay of a recorded string. The separation of the array of entries uses the MID\$ command. The information can be displayed and a hardcopy created prior to use.

The student spectator sport starts in line 4000 where the user is prompted for the student's name, tutor group, the date this schedule is being created, and the number of subjects on this schedule. The last item is used in a FOR...NEXT loop which starts at the end of this line.

Line 4010 prompts for block number and subject code (four characters) which will have been allocated as a result of the student's interview with the admissions officer. When all subjects have been allocated, a reminder about the printer is again given with the flashterisk routine as a prompt. Any key will now activate the printer routine which starts in line 4020. The student's schedule is printed out in tabular form.

The flag variable Q which was set to zero in line 4000 is used to repeat the printing process in line 4040. This allows for multiple copies: one for the office and one for the student. If two-ply paper is used this will not be needed; or if the printer also punches a paper tape, then only one schedule copy need be printed since duplicates can be made from the paper tape.

The printing subroutine returns to 4010, and the program jumps to 4070 which prompts for another set of schedule data or a return to the menu.

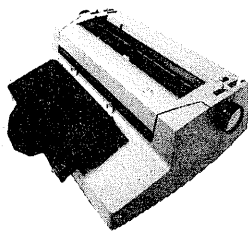
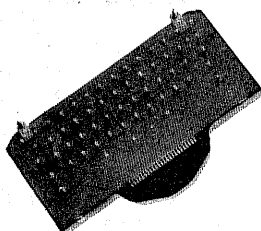
It is not a polished program. For one thing, it was written and tested in a single day to fulfill a need which could not be delayed. For another, it would be much more useful to us if the room information were printed as well. It fulfilled its function, however, and was a vivid demonstration to enrolling students that our College is fully committed to the use of the TRS80 as well as to the teaching of computing. Next year, perhaps, an extended version will be able to handle even more of the effort of our admissions procedure. Meantime, I hope that this description will quicken the pulses of a number of readers who have been faced with similar problems. ●



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Circle 56

# HI-TYPE G

For TRS-80 Model I

Steve Kelley  
Oakland, CA

**This program acts as the driver routine for a Diablo HI-Type G daisy wheel printer, which allows it to run at maximum speed in the bi-directional, logic-seeking mode. The characteristics of the interface needed are described in Figure 1.**

If you need a routine to operate your Diablo Hi-Type daisy wheel printer at it's fullest potential then your dinner will become quite cold while you finish this article.

How does one reposition a print head from the end of a 21 character line to the end of a 45 character line in a straight line, and then print the line backwards? Time to outline:

- I. Must print bi-directional.
- II. Must be logic-seeking.
- III. Must use hi-speed tabs on both directions.
- IV. Never more than one motion between printed characters and must be straight line (shortest distance).
- V. Must restore upon initialization and on receipt of control characters (i.e., 28).
- VI. Must home to left margin after reasonable delay without hardware or interrupts and without affecting position of subsequent characters printed.

The first draft of the program was quite bulky, and it contained a considerable amount of duplication. For instance, the routine to print from left to right was identical to the right to left routine except that the logical column (where the print head should be) is decremented after each character instead of incremented. The same was true of the routine to send the buffer characters to the print routine singly. Left to right the pointer started at the beginning of the buffer and was incremented and reverse printing was achieved by starting at the end of the buffer and decrementing after each character. Since the program was to reside in RAM, it could be made to be self-modifying, that is, after a line is printed in one direction, the program could modify itself so that the next time the same routine is called the opposite direction will result. Changing the increments at "DIR" and "SPACE" to decrements and the "BUFF" at "OUT1" to "BUFF + N" (for n number of columns) were all the changes necessary to implement both directions with one routine.

The logic-seeking part is a tough nut to crack, mainly because a lot of people don't really know what it means. Generally, it means that the carriage does not arbitrarily return to either margin while in use, but proceeds to the position where the next character

will be printed. So, save the characters until the whole line to be printed is received (otherwise it could not print backwards) and don't move the print head until a character needs to be printed. When is this actually done? If characters are stored, waiting for a CRLF (carriage return, line feed) and CRLF's are stored until ready to print, the program is always waiting and storing, never printing. The solution turned out to be very simple: Never print a line until a CTRL character is received (i.e., CRLF) and never position the print head until it is time to print a character. This takes care of items 3 and 4 of the outline. The complex calculations that might be necessary to position the print head are not needed. The entire buffer is sent to the print routine regardless of how long (or short) the line. Since spaces are not printed, but merely increment the logical column, the entire buffer's contents are "printed", but the print head is left over the last character printed. When the next line is sent, it will be printed in reverse, so all the spaces in the right-hand end of the buffer will just decrement the logical column until a printable character is found. At this time the logical column (where the print head should be) is subtracted from the physical column (where the print head is) and the print head is moved the difference of the two, in the direction of the sign of the difference. Following the flow of the program, when several CRLF's are sent consecutively the entire empty buffer is sent to the print routine for each CRLF, which means that logically the printer is printing 132 spaces for each line. Logically, because the print head never physically moves during the process. If it did it would scan the entire length of the platen for each line like many bi-directional printers do.

When the Hi-Type routine is called with a printable character in the "C" register, the character is inserted into the buffer "BUFF" and the buffer pointer (at "INBUF") is incremented (see program listing). When a control character is received, things start to happen. "OUTBUF" is called and its contents are sent to the print routine ("HITYA"). Upon receipt of the first printable character, "MOVE" is called to position the print head from its last physical row and column (PROW & COL) to the row and column of the current character (IX+4 & IX+5) in a straight line. Actually, "MOVE" is called before every character printed, but normally only one character position is advanced. Last, if the control character received was

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Circle 53

a CR, the logical row is incremented, but the head is not actually moved until the next printable character causes "MOVE" to be called.

The RESTORE routine is straightforward and does just that. It restores the printer to the left margin, clears the program pointers and buffer. This is done at the time the Hi-Type program is loaded and executed and assures that the logical and physical pointers match. For instance, if the print head was at column 5 and the PCOL was 30, a hi-speed carriage return would have disastrous results. Oh, while we are on the subject of disastrous results, notice the title of the source program, "HITYPE G". Anyone interested in seeing some spectacular jams and crashes is welcome to try HITYPE A-F.

The home-to-left-margin routine wasn't easy. A counter had to be decremented while the print routine was not being used, and the carriage homed to the left margin when it reached zero. The keyboard check routine was intercepted for this purpose, so each time the keyboard is scanned, the counter is clocked. When the clock strikes ONE the mouse runs to the left margin. All pointers are also set to the left-to-right direction, and subsequent characters are printed correctly regardless of the position or direction when printing stopped. This counter is preset each time a new line is printed.

With any machine language program, changes may have to be made to run properly on your

machine. The assumptions made about hardware are listed in Figure A, so get rid of your computer and interface and get one that matches these

Figure 1

### Hardware Assumptions

The ORG statement assumes 64K memory protected at 64000 for Basic.

TRSDOS entry point is 402DH.

LPRINT jump vector of line printer routine is at 4016H.

KBSCAN jump vector of keyboard driver is at 4026H.

IX is pointing at the device control block.

IX+4= line counter and IX+5= character counter.

Input character in register "C".

Time factor loaded into "TIME" in clear routine makes 1 second delay.

#### IN-PORT 37E8H

Bit 4 - Hammer busy

Bit 5 - Carriage busy

Bit 6 - Paper busy

Bit 7 - Fault condition

#### OUT-PORT 37E9H

Bits 0 & 1 - MSB of DATA word

Bit 2 - Direction

Bits 4 & 5 0 is print command, 1 is carriage command, 2 is paper command and 3 is restore command.

#### OUT-PORT 37EAH

Bits 0 through 7 - LSB of DATA word

#### OUT-PORT 37EBH

No data - strobes printer

## Machine Language Application

parameters. On the other hand, if you wish to substitute the appropriate values for your computer and interface, you should have little difficulty in the modification. The WOS section of the program is the area affected.

Now the Hi-Type runs at maximum speed always taking the shortest and fastest route. It will print columns of information in both directions with

almost no extra time spent on long tabs. Truly an impressive sight to watch. Plotting is another story...

The source and object code of the program, with instructions and the short version (less than 100 bytes) are available on cassette for the TRS-80 for \$8 ppd. Help with interfacing is available if you send a SASE to the author at 9506 Peach St., Oakland, CA 94603.

```

00100 ;                *HITYPE G*
00110 ;
00120 ;BI-DIRECTIONAL  LOGIC-SEEKING
00130 ;
00140 KBSCAN EQU      4016H
00150 LPRINT EQU      4026H
00160 TRSDOS EQU      402DH
00170          ORG      0FA01H          ;FOR RAM AT 64K.
00180 ;
00190 HITYPE LD        A,C              ;MASK OFF PARITY.
00200          AND      7FH
00210          LD        C,A
00220          CP        20H          ;CNTL CHAR ?
00230          JR        C,CNTLS
00240          PUSH     HL              ;NO, PUT IN BUFFER.
00250 INBUF  LD        HL,BUFF
00260          LD        (HL),A
00270          INC      HL              ;INC POINTER AND
00280          LD        (INBUF+1),HL  ;PUT IT BACK.
00290          POP      HL
00300          RET
00310 ;
00320 CNTLS  CALL     OUTBUF          ;PRINT LINE IN BUFF.
00330          LD        A,C
00340          OR        A              ;NULL ?
00350          RET      Z              ;YES, ALL DONE.
00360          CP        0DH          ;CR ?
00370          JR        NZ,CNTL1     ;NO, TRY AGAIN.
00380          INC      (IX+04H)      ;INC LOGICAL ROW
00390          RET              ;FOR CR AND RETURN.
00400 CNTL1  CP        1CH          ;RESTORE ?
00410          RET      NZ          ;NO, ALL DONE.
00420 ;
00430 RESTOR PUSH     HL
00440          LD        HL,3000H     ;CMD WORD FOR RESTORE.
00450          CALL     WOSA          ;(WOSA DOESN'T WAIT)
00460          CALL     CLEAR        ;CLEAR POINTERS TO L-R.
00470          LD        HL,BUFF
00480          LD        B,132
00490 REST1  LD        (HL),20H      ;SET BUFF TO SPACES.
00500          INC      HL
00510          DJNZ     REST1
00520          POP      HL
00530          XOR      A
00540          LD        (PROW+1),A    ;ZERO PHYS ROW.
00550          LD        (PCOL+1),A    ;DITTO PHYS COL
00560          LD        (IX+04H),A    ;AND LOGICAL ROW.

```

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00570	LD	(IX+05H),A	;SAME FOR LOGICAL COL.
00580	RET		
00590	;		
00600	OUTBUF	PUSH HL	
00610		PUSH BC	
00620	OUT1	LD HL,BUFF	;POINTER SET.
00630		LD B,132D	;QTY OF COLUMNS.
00640	LOOP	LD C,(HL)	;CHAR TO C REG.
00650		LD (HL),20H	;CLEAN-UP AS YOU GO.
00660		CALL HITYA	;CALL PRINT ROUTINE.
00670	DIR	INC HL	;INC (OR DEC) POINTER.
00680		DJNZ LOOP	
00690		LD A,(DIR)	;INDICATES DIRECTION.
00700		CP 23H	;LEFT TO RIGHT ?
00710		LD A,2BH	;HEX FOR DEC HL.
00720		LD B,35H	;HEX FOR DEC (IX+NN).
00730		LD HL,BUFF+131D	;END OF BUFF.
00740		LD (IX+05H),131D	;LCOL SET TO RIGHT SIDE.
00750		JR Z,DIR1	;IF L-R THEN A-OK.
00760		POP BC	;IF NOT THEN SET UP
00770		POP HL	;FOR L-R WITH CLEAR.
00780	CLEAR	PUSH HL	
00790		PUSH BC	
00800		LD A,23H	;HEX FOR INC HL.
00810		LD B,34H	;HEX FOR INC (IX+NN).
00820		LD HL,BUFF	;BEGINNING OF BUFF.
00830		LD (IX+05H),0	;LOGICAL COL SET TO LEFT.

## Machine Language Application

```

00840 DIR1    LD      (DIR),A      ;FILL IN THE HOLES
00850        LD      A,B          ;WITH ALL THOSE HEX
00860        LD      (SPACE+1),A  ;INSTRUCTIONS.
00870        LD      (OUT1+1),HL
00880        LD      HL,BUFF      ;RESET INPUT POINTER.
00890        LD      (INBUF+1),HL
00900        LD      HL,OF800H
00910        LD      (TIME),HL    ;RESET TIMER CLOCK.
00920        POP     BC
00930        POP     HL
00940        RET
00950 ;
00960 HITYA   LD      A,C          ;HERES THE PRINT ROUTINE.
00970        CP      20H          ;SPACE ?
00980        JR      Z,SPACE      ;YES, JUST INC LCOL.
00990 CHAR    CALL    MOVE        ;GOT A CHAR, POSITION THE
01000        PUSH   HL            ;HEAD.
01010        LD      L,C          ;CHAR TO L AND
01020        LD      H,00H        ;PRINT CMD TO H.
01030        CALL   WOS          ;SEND CMD TO PRINTER.
01040        POP     HL
01050 SPACE  INC      (IX+05H)    ;INC (OR DEC) LCOL
01060        RET
01070 ;
01080 MOVE    PUSH   HL
01090        PUSH   DE
01100        PUSH   BC
01110        LD      A,(IX+05H)    ;I THINK I'M HERE,
01120 PCOL   SUB     00H          ;BUT I'M REALLY HERE.
01130        LD      HL,1000H     ;CMD FOR CARRIAGE MOVE.
01140        LD      B,06H        ;SPACE BETWEEN LETTERS.
01150        CALL   MOV1         ;DO IT.
01160        LD      A,(IX+05H)    ;NOW I AM HERE
01170        LD      (PCOL+1),A   ;AND I'LL REMEMBER.
01180        LD      A,(IX+04H)
01190 PROW   SUB     00H          ;(NOW DO THE SAME THING
01200        LD      HL,2000H     ;FOR PAPER MOVE)
01210        LD      B,08H        ;SPACE BETWEEN LINES.
01220        CALL   MOV1
01230        LD      A,(IX+04H)
01240        LD      (PROW+1),A   ;NEW POSITION.
01250        POP     BC
01260        POP     DE
01270        POP     HL
01280        RET
01290 ;
01300 MOV1    JR      NC,MOV2      ;SKIP IF POSITIVE.
01310        CPL
01320        INC     A             ;CHANGE TO POSITIVE.
01330        SET    02H,H         ;SET DIRECTION BIT.
01340 MOV2    LD      E,A          ;DIFF TO E.
01350        LD      D,00H        ;ZERO D.
01360 MOV3    ADD     HL,DE        ;MULTIPLY TIMES B.
01370        DJNZ   MOV3

```



```

01380 ;
01390 WOS      PUSH      BC
01400          LD        A,H
01410          AND       OFOH          ;GET WAIT MASK FROM CMD
01420          JR        NZ,WOS2      ;WHICH DOESN'T ALWAYS
01430          LD        B,10H        ;WORK SO CHECK FOR ZERO
01440          JR        WOS1         ;AND USE 10 IF SO.
01450 WOS2     RLCA
01460          LD        B,A          ;MAKE MASK FROM NON-ZERO
01470 WOS1     LD        A,(37E8H)    ;CMD.
01480          AND       B           ;GET PRINTER STATUS.
01490          JR        NZ,WOS1      ;MASK OFF OTHER BITS.
01500          POP       BC          ;LINE IS BUSY, CALL BACK.
01510 WOSA     LD        A,H          ;CMD WORD MSB TO A
01520          LD        (37E9H),A     ;AND TO PRINTER.
01530          LD        A,L          ;CMD WORD LSB TO A
01540          LD        (37EAH),A     ;AND FOLLOW MSB.
01550          LD        (37EBH),A     ;STROBE PRINTER
01560          RET
01570 ;
01580 POWER    LD        HL,(KBSCAN)  ;GET KB ROUTINE ADDRESS
01590          LD        (CLOS1+1),HL  ;AND CLOSE WILL JP TO IT.
01600          LD        HL,CLOSE     ;GET CLOSE ADDRESS
01610          LD        (KBSCAN),HL  ;AND KB WILL JP TO IT.
01620          CALL     RESTOR        ;RESTORE PRINTER.
01630          JP       TRSDOS       ;BACK TO MAIN SYSTEM.
01640 ;
01650 ;
01660 ;
01670 CLOSE    PUSH      HL
01680          PUSH     IX
01690          LD        IX,4025H      ;DCB OF PRINTER.
01700          LD        HL,(TIME)    ;GET THE CKOCK COUNTER.
01710          INC      HL           ;TICK-TOCK.
01720          LD        (TIME),HL    ;PUT IT BACK.
01730          LD        A,H
01740          OR        L           ;HOW'S IT DOING ?
01750          JR        NZ,CLOS2     ;SKIP IF NOT TIME.
01760          CALL     CLEAR        ;POINTERS TO L-R.
01770          CALL     MOVE        ;GO TO LEFT MARGIN.
01780 CLOS2    POP       IX
01790          POP       HL
01800 CLOS1    JP       0000H        ;KBSCAN GOES HERE.
01810 ;
01820 TIME     DEFW     0000H        ;HAD TO PUT IT SOMEWHERE.
01830 ;
01840          DEFS     50           ;ELBOW ROOM.
01850 ;
01860 BUFF     DEFS     132D        ;BUFFER. LENGTH OPTIONAL.
01870 ;
01880          ORG      LPRINT        ;LOAD HITYPE ADDRESS OVER
01890          DEFW     HITYPE        ;THAT OTHER ONE.
01900 ;
01910          END      POWER        ;SO EXECUTE DOES POWER-UP.

```



# Drawing Aid

For Model I TRS-80

Mike Tattersall  
Auckland, New Zealand

## View Problems

One look at Figure 2 and you will see visualization can be a problem. You can get around this in several ways: (1) Unless one is desirous of a worms-eye or special view it always pays to have the origin outside the figure (see drawing 1). (2) Choose an object of roughly similar dimensions, run it and play around with the viewpoint and scale until all is clear. (3) It often helps to add some reference spot on one side to identify it, especially in symmetrical figures. (4) Another trick is to shade the inside surfaces or to number the points in your drawing as well. (5) Avoid using too much detail too early in drawing the piece because the clutter will confuse the eye.

## The Program

Actual calculation is only 18% of the program. The rest is input, output and management. Instructions are kept to a minimum as experience has shown there is no substitute for trial and error.

The horizontal view angle moves the eye counter-clockwise in the Y plane away from the negative end of the X axis. The vertical view angle raises the eye above that point in the Z plane. The view distance is scalar, although at infinite view distances there is no distortion of scale or slope. As the viewpoint (eye)

From time to time many of us have need to express on paper what isn't simple with words. So we avoid the task because we can't get it right or we need too many words. (Did someone say a thousand?)

This simple program takes points from an X-Y-Z matrix and converts them to an X-Z plane, permitting isometric and perspective sketching and drawing. It replaces laborious calculations and skilled drawing board work, permitting rapid examination of complex shapes by quick plotting on graph paper. And, it wins hands down on trial and error examination of shapes to insure the best presentation of information.

Best applications for the program are aiding visualization of three dimensional objects, especially for complex or curved shapes. When using other than 90 degree viewpoints the program will often show up anomalies.

The program will locate the vanishing points of perspective which is a real aid to final production. This is especially good for those who prefer to add the detail after the main framework has been drawn.

The input data is often arbitrary. If the results are not satisfactory the data can easily be manipulated in the command mode of Basic (see pages 6/4 in the Level II Manual).

gets closer to the object the vanishing points also get closer with consequent distortion just as the eye would see it. This will be true until the vanishing points are in scale and plottable. (See Figure 3).

The view elevation simply moves the drawing up/down the Z axis. It is useful if numerous points are needed on one sheet with vertical separation. Many buildings on one sloping site, each drawn by itself but all related to a site data, would be a good application of this.

The stereo angle can be used for enhancement. By using very small angles a thick/thin effect can be seen with overlapping views. However, its primary function is for stereo drawings. Those who need this function will understand its use. Used for enhancing, it is a gimmick, and a poor one at that. With the proper viewer, it comes into its own. Stereo views can be very hard to produce. But for example, with this program, multi-story buildings can be "looked into" to aid location of interior objects. Or, the inside of a yacht can be viewed and internal detail can be sketched in.

The reference object used in the drawings is a tape recorder like the ones accompanying the Model I. Pick it up and try to decide what angles will best show the recording head. Decide on the angles, set up the matrix, steal the kid's ruler and graph paper and have a go.

#### Problems with the Program

Right away problems emerge. Look at Figure 2. All three sketches show the same output and all are the same, aren't they? They are all plotted results from table 1, but the lowest plot is wrong. It's a mirror image.

If you blink at the top view of Figure 2 it will turn inside-out for you.

In some cases the SIN, COS and ATN functions have sign problems and hidden points go upside-down, but these only happen when trying extreme angles. However, 99.9% of the time these don't affect the final result, as the angle can be changed or the data shifted to get away from the problem.

Table 1 shows the input/output of the matrix for Figure 2. Use it to prove your keying of the program.

Note the unsuitability of the view distance chosen for Figure 3. It gives miles too much distortion, but it does demonstrate the effect of perspective. The only true scale views are isometric and the parameters for these are remarked in the program.

#### Other Notes

Figure 4 shows how the object moves as the view point changes, letting different parts be shown as required. The top view is: HA=30, VA=10, VD=9E9, and VE=0; the middle view is: HA=50, VA=30, and the rest is the same; the lower view is: HA=70, VA=50 and the rest is the same. The combinations are endless.

With 16K Level II, you can process some 350 points, not an unusual number for this type of

program (i.e., a yacht's lines contain 300 odd points). A 4K Level II user will need to delete the instructions and line printing sections and, by a bit of judicious trimming elsewhere, be able to handle 40-50 points.

The program doesn't like to divide by zero, so you must (within scale limits) avoid values of zero in your X-Y-Z matrix. Move a little way off them. Line 580 prevents scientific notation from messing up the video layout, but can be removed if wanted.

As there are a few trigonometric functions, conversion is slow in a big matrix. To settle fears of lockup or endless looping, the current point being processed is flashed on the screen.

Presumably the trig functions are simply a hardware version of the routines in the Level I manual. There seemed no point in going to machine

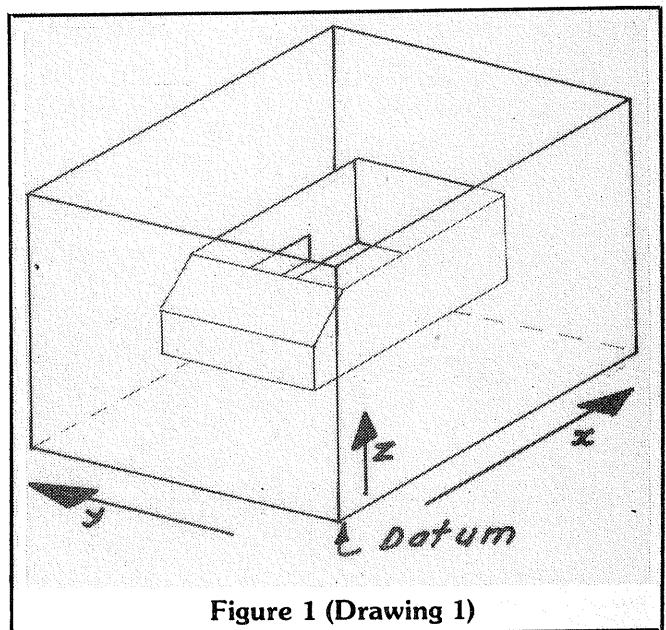


Figure 1 (Drawing 1)

language calls to speed these up. Efforts to speed things up elsewhere showed that  $X^*X$  was much faster than  $X$  raised to the second power (using the up arrow). Integers control the loops for speed. Since they made no difference elsewhere, the A1's and D2's, etc., were retained for clarity.

The program could stand a lot of improvement. However, it is a working tool, not a demo thing.

Two small changes possible are rejection of zero in the input and suppression of the right-X in the display and listing (right-X begins the stereo X-value for the right eye view). Line 750 is a printing pause, delete it if you don't want it.

Most end users of this program, like draftsmen, illustrators, architects, designers and engineers, will know what they want straight away. Lecturers and magazine contributors and those who fiddle will use up a lot of graph paper in achieving the desired results.

And get in a stock of bananas, too!

(Program listing starts on page 116)

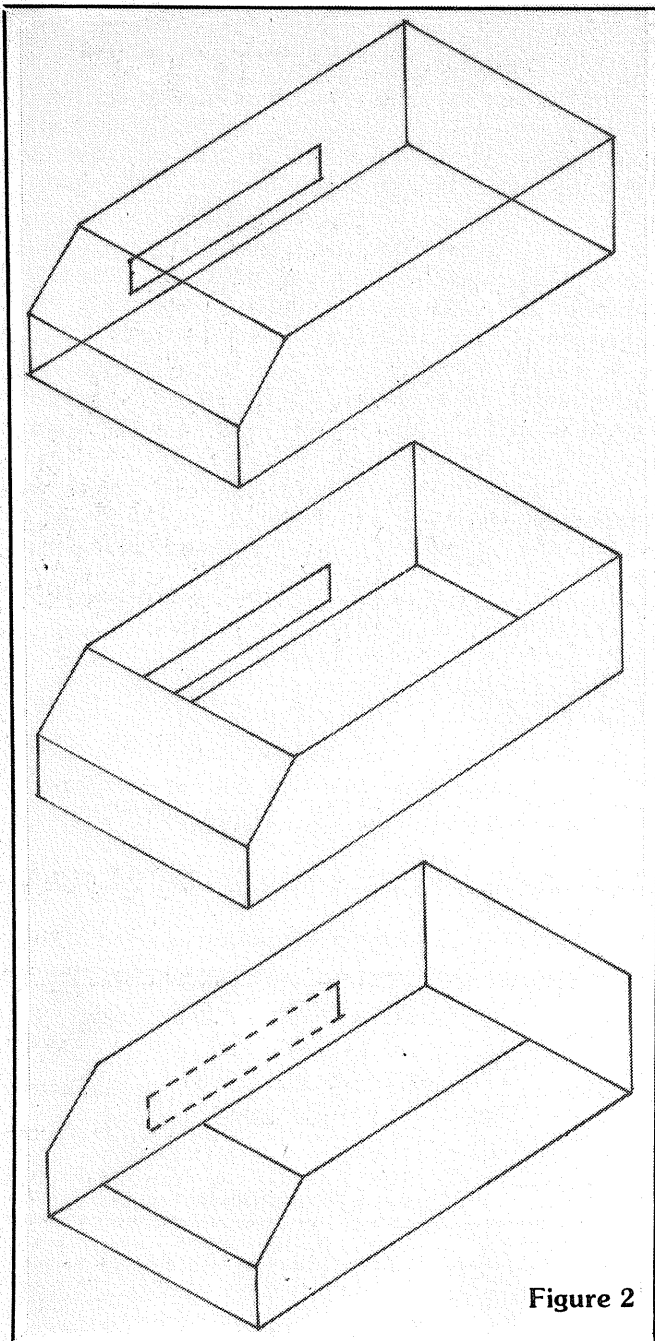


Figure 2

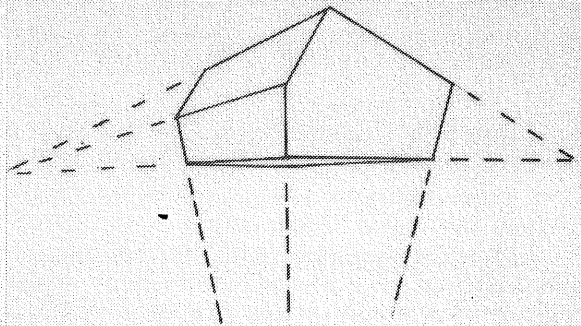


Figure 3

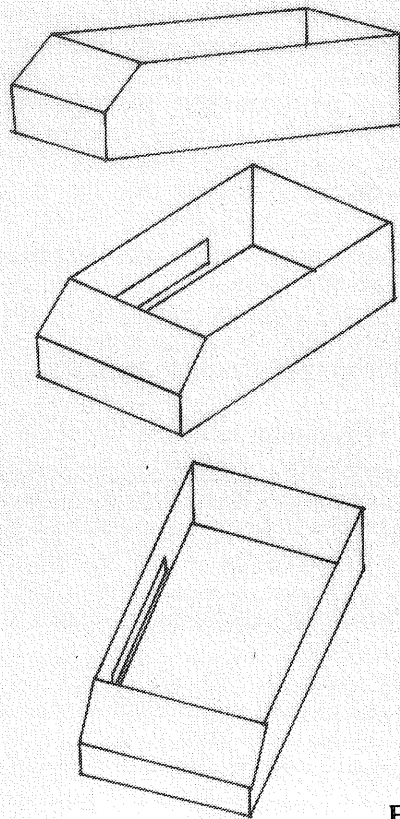


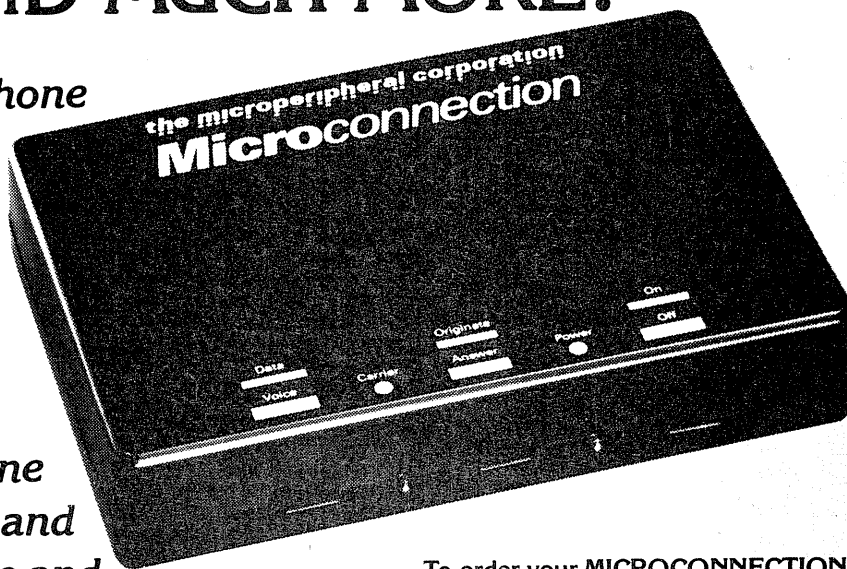
Figure 4

#	X	Y	Z	LEFT X	RIGHT X	VERTICAL
1	7	7	7	-.22062	.22061	14.2883
2	7	21	7	-13.0362	-11.7126	21.4319
3	33	21	7	9.12553	12.0877	34.6985
4	33	7	7	21.9411	24.0209	27.5549
5	33	7	14	22.1616	23.8003	34.6997
6	33	21	14	9.34607	11.8671	41.8432
7	27	21	8	4.0428	6.56379	32.6577
8	27	21	10	4.10582	6.50078	34.699
9	14	21	8	-7.03804	-5.33635	26.0243
10	14	21	10	-6.97503	-5.39936	28.0657
11	14.5	21	14	-6.42281	-5.06768	32.4035
12	10.5	0	7	9.17045	9.3911	12.5024
13	7	7	10.5	-.110348	.110339	17.8607
14	7	21	10.5	-12.9259	-11.8229	25.0042

HORIZ ANGLE= 45  
 VIEW DIST= 9.9E+10  
 VERT ANGLE = 35.26  
 DEV= 0  
 STEREO ANGLE= 5

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TRS-80 Model I BASIC Compilers

Table below shows the BASIC subset translated by ACCEL and ACCEL2 to machine code. Figures represent the minimum expected ratio of execution times, compiler to interpreter. All other BASIC statements and functions run at interpreter speed after compilation.

	INTEGER	SINGLE	DOUBLE	STRING
Assignment (LET)	115	3.3	3.4	7.6
Array Reference (1-dim)	35	78	66	34.5
AND or OR	41	2.5	2.0	
Compare (<, etc)	30	1.6	1.4	4.2
Add, Subtract, Concat	47	2.0	1.5	4.9
Multiply (*)	3.3	2.0	1.5	
Divide (/)	2.0	2.0	1.02	
Reference to a constant	69	65	54	2.1
FOR with NEXT	15			
POKE	82	4.6	3.6	
SET or RESET	6.7	3.1	2.6	
IF THEN ELSE	11.1	3.0	2.3	7.6
ON expression GOTO	15.8	3.2	2.8	
<b>Functions</b>				
VARPTR	33	47	47	44
USR	11.2	3.7	2.8	
POINT	6.9	3.0	2.5	
PEEK	52	4.4	3.5	
LEN				43
MIDS				4.1
LEFT\$				3.0
RIGHT\$				2.8
CHR\$				4.7
ASC				30
CVI				28
<b>Flow of Control</b>				
GOSUB with RETURN	137			
GOTO	204			
All other BASIC statements and functions	1.0	1.0	1.0	1.0

**ACCEL:** For 16K TRS-80 Model I. Compiles boldface subset in INTEGER variable type. Compile-time size 2816 bytes, run-time size 256 bytes. Trade up later to ACCEL2 for the price difference. \$44.95 + .75 shipping

**ACCEL2:** For 32K TRS-80 Model I. Compiles subset in all variable types. Compile-time size 5120 bytes, run-time size 1024 bytes. Local and Global options help control growth of the compiled code. Output save to Disk, Stringy/Floppy, TRSDOS and most vendor DOSs supported. Use ACCEL2 during BASIC program development for easy huge speedups. \$88.95 + 1.50 shipping

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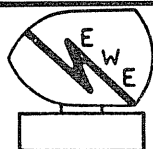


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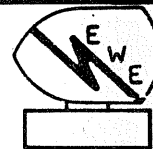
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100 CLS:PRINT"D R A W I N G   A I D"
110 PRINT:PRINT
120 INPUT"WANT INSTRUCTIONS (Y/N)";A$
130 IFLEFT$(A$,1)<>"Y" GOTO300
140 PRINT"HORIZONTAL VIEWING ANGLE IS ";
150 PRINT"TAKEN ANTI-CLOCKWISE FROM"
160 PRINT"THE -VE END OF THE X AXIS."
170 PRINT"VERTICAL VIEWING ANGLE PUTS ";
180 PRINT"THE EYE ABOVE THIS POINT."
190 PRINT"VIEWING DISTANCE SETS SCALE ";
200 PRINT"I.E. 9E9 = INFINITY ( THE "
210 PRINT"SMALLEST SCALE ) WHILE LESS";
220 PRINT" BRINGS IN PERSPECTIVE."
230 PRINT"VIEWING ELEVATION LIFTS THE ";
240 PRINT"PICTURE UP/DOWN THE Z AXIS."
250 PRINT"STEREO CAN BE USED FOR ENHAN";
260 PRINT"CEMENT BY ENTERING VERY SMALL"
270 PRINT"ANGLES, FOR A POCKET VIEWER ";
280 PRINT"5 DEGREES IS ABOUT RIGHT."
290 PRINT:PRINT
300 INPUT"HOW MANY SETS OF POINTS";PN
310 DIM ST(PN,3),A(PN,3):C1=ATN(1)/45
320 DEFINT I-N:FOR I=1 TO PN
330 PRINT"ENTER X-Y-Z FOR POINT ";I:
  INPUTST(I,1),ST(I,2),ST(I,3):NEXTI
340 CLS:INPUT"HORIZ VIEW ANGLE IS";HA:
  HA=HA*C1
350 INPUT"VERTICAL VIEW ANGLE IS";VA:
  INPUT"VIEWING DISTANCE IS";VD:
  VA=VA*C1
360 INPUT"ENTER VIEWING ELEVATION";VE:
  INPUT"ENTER STEREO ANGLE OR 0";SA:
  SA=SA*C1
370 PRINT"CONVERTING NOW. . .":GOTO450
380 PRINT"HERE'S THE TABULATED VALUES"
390 PRINTTAB(1)"#";TAB(4)CHR$(170);
  TAB(7)"X";TAB(15)"Y";TAB(23)"Z";
  TAB(28)CHR$(170);TAB(31)"LEFT X";
  TAB(42)"RIGHT X";TAB(54)"VERTICAL"
400 FORI=1TO PN
410 PRINTTAB(0)I;TAB(4)CHR$(170);
  TAB(6)ST(I,1);TAB(13)ST(I,2);
  TAB(21)ST(I,3);TAB(28)CHR$(170);
  TAB(30)A(I,1);TAB(41)A(I,2);
  TAB(53)A(I,3)
420 IFINT(I/15)-I/15=0 INPUT"MORE";X$:
  NEXTI:ELSE NEXTI
430 PRINT:PRINT"HORIZ ANGLE =" ;HA/C1,
  "VERT ANGLE=" ;VA/C1:
  PRINT"VIEW DISTANCE=" ;VD,
  "ELEV=" ;VE:IFSA=0 PRINT" ":ELSE
  PRINT"STEREO ANGLE =" ;SA/C1
440 PRINT"ENTER 999 FOR MENU";:INPUTM:
  IFM<>999 GOTO430 ELSE GOTO 600
450 FORI=1 TO PN
460 PRINT@480,"      ":PRINT@480,I
470 X=ST(I,1):Y=ST(I,2):Z=ST(I,3)+VE
480 D1=SQR(X*X+Y*Y):
  A1=ATN(Y/X)+HA
490 YN=D1*SIN(A1)
  XN=D1*COS(A1)
500 IF VA=0 GOTO530
510 D2=SQR(Z*Z+YN*YN):
  A2=ATN(Z/YN)+VA
520 ZN=D2*SIN(A2):
  YN=D2*COS(A2)
530 SC=YN/VD+.8:IFSA=0 THEN
  C=0:RX=0:GOTO560
540 C=2*YN*TAN(SA/2)/SC
550 RX=XN/SC+C/2
560 XL=XN/SC-C/2:ZN=ZN/SC
570 A(I,1)=XL:A(I,2)=RX:A(I,3)=ZN
580 FORJ=1TO3:IFABS(A(I,J))<1E-5 THEN
  A(I,J)=0:NEXTJ:ELSE NEXT J
590 NEXTI
600 CLS:PRINT@448,
  "1 = SINGLE POINT DISPLAY":
  PRINT"2 = BLOCKS OF 15 POINTS":
  PRINT"3 = A NEW VIEWPOINT":
  PRINT"4 = LPRINT RESULTS OUT"
610 INPUTN:ON N GOTO620,380,340,650
620 PRINT:PRINT"ENTER POINT NUMBER";:
  INPUT" OR 999 FOR THE MENU";L:
  IF L=999 GOTO600
630 PRINT"POINT #";L;" WAS ";ST(L,1);
  " ";ST(L,2);" ";ST(L,3)
640 PRINT"ADJUSTED VALUES ARE ":
  PRINT"X (LEFT)      =" ;A(L,1):
  PRINT"X (RIGHT)     =" ;A(L,2):
  PRINT"Z (VERTICAL)  =" ;A(L,3):
  GOTO620
650 IFPEEK(14312)>127 GOTO730
660 LPRINTTAB(1)"#";TAB(4)CHR$(58);
  TAB(7)"X";TAB(15)"Y";TAB(23)"Z";
  TAB(28)CHR$(58);TAB(31)"LEFT X";
  TAB(42)"RIGHT X";TAB(54)"VERTICAL"
670 GOSUB750
680 FOR I=1 TO PN
690 LPRINTTAB(0)I;TAB(4)CHR$(58);
  TAB(6)ST(I,1);TAB(13)ST(I,2);
  TAB(21)ST(I,3);TAB(28)CHR$(58);
  TAB(30)A(I,1);TAB(41)A(I,2);
  TAB(53)A(I,3):GOSUB750
700 NEXT I:LPRINT:LPRINT:
  LPRINT"HORIZ ANGLE=" ;HA/C1,
  "VERT ANGLE =" ;VA/C1:
  GOSUB750:LPRINT"VIEW DIST=" ;VD,
  "DEV=" ;VE,"STEREO ANGLE=" ;SA/C1
720 LPRINT:LPRINT:GOTO600
730 CLS:PRINT@448,"TURN ON PRINTER"
740 GOTO600
750 FOR PA=1 TO 60:NEXT PA:RETURN
760 REM * ISOMETRIC VIEWS USE :
  HA=45 VA= 35.26 VD= 9E9
  AND SCALE IS THEN CORRECT
770 REM * VANISHING POINTS ARE AT *
  9E9,0,0 FOR X AXIS
  0,9E9,0 FOR Y AXIS
  0,0,9E9 FOR Z AXIS

```

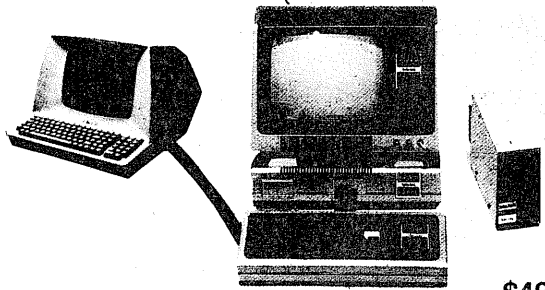
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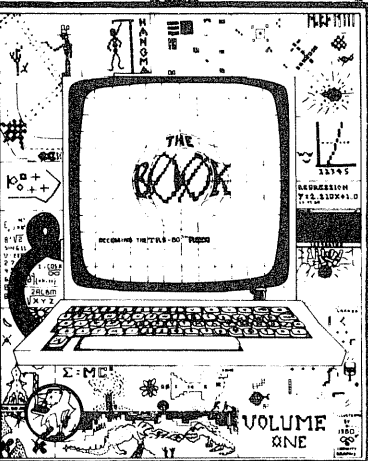
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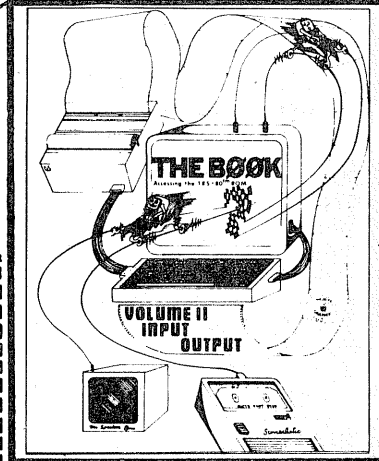
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Circle 61

# NEW PRODUCTS

# NEW PRODUCTS

## POWER PACK for Color Computer

Computerware announced its POWER PACK for the Radio Shack Color Computer. The Power Pack cartridge plugs into the Color Computer's interface slot, providing 6K additional RAM memory and a powerful 2K monitor. The monitor provides the sophisticated programmer 33 machine level commands and many utility routines. With its extra memory and routines in ROM, this new Power Pack allows Computerware and other software sources to supply users with much more sophisticated software on cassette at much lower prices than the ROM packs currently available. Computerware also includes with the Power Pack a free cassette of diagnostics for the Color Computer. Already available for use with the Power Pack is Computerware's Color Editor (\$24.95), Color Assembler (\$29.95), and Color Invaders (\$19.95). The Power Pack is available directly from Computerware, Box 668, 1512 Encinitas Blvd, Encinitas, CA 92024 (714) 436 3512 at the introductory price of \$159.

Circle 112

## Proofreader by Soft-Tools

Proofreader allows your TRS-80 to check your documents for spelling errors. It will work in conjunction with almost any word processor for the TRS-80 such as Scripsit or Electric Pencil. After a document has been prepared, Proofreader will scan it and check all words in its own 38,000 word dictionary. It also can check a user supplied auxiliary dictionary containing technical words, names, etc. not found in the master dictionary. Any words not found either in the master or user dictionary are then listed on the screen, and may be saved in a file and printed. Proofreader is a machine language program and is fast. Almost any size document can be checked in under 5 minutes on the Model I and III, and even less time on the Model II. Once the misspelled words are found, the original document can be corrected to remove the errors. Proofreader is an invaluable tool for anyone who uses the TRS-80 for word processing. All versions of Proofreader require an operating system compatible with the latest version of TRSDOS and at least one disk drive. Prices are \$54 for Model I, \$64 for Model III and \$109 for Model II. Contact Soft-Tools MHE Box 14, Tijeras, NM 87059

Circle 113

## The Rhythm Box

The Rhythm Box is a new computer peripheral that synthesizes the sounds of seven different percussion instruments including bass drum, wood block, snare drum, short cymbals, long cymbals, hand-clap, and tom-tom. It is easy to program in Level II Basic or assembly language; a single OUT instruction generates any combination of percussion sounds plus a loudness control for rhythmic emphasis. It was designed for game players, computer-music enthusiasts, music teachers and professional musicians who want to create anything from a simple repetitive rhythmic pattern to a long continuously varying percussion score. The Rhythm Box is available with two interface options: Model RBX-T (\$149.50) for the Model I Level II TRS-80 has a 40-pin ribbon cable that plugs into the keyboard or EI bus extension connector. The Model RBX-S is for all other computers. Include \$3.00 shipping and handling. An audio demo cassette is available (US only) for \$1. Contact Newtech Computer Systems, Inc. 230 Clinton Street, Brooklyn, NY 11201 (212) 625-6220



Circle 109

## TRS-80 Cheaptalk

CHEAPTALK is a TRS-80 software package which allows your computer to talk through any small audio amplifier connected to the cassette output plug. Utilities are provided to convert spoken words into self-contained subroutines usable in Basic or Z80 assembly language programs. These routines are easily merged with your own programs to add the dimension of speech. Cheaptalk is \$19.95 ppd from Alan Saville, PO Box 5190, San Diego, CA 92105 (714) 264-8266

Circle 111

## Cribbage for Models I & III

This classic card game is now being offered for the TRS-80 Models I and III. Following Hoyle, this program has fast response time and clear playing format. Ideal for learning (includes a HELP command), Cribbage also can and has, stumped the experts. Cribbage is written in Basic with machine language patches and will work on Level I, II or DOS systems. Price is \$16.95 on cassette, \$19.95 on disk. For further information call or write The Alternate Source, 1806 Ada Street, Lansing, MI 48910 (517)487-3358

Circle 108

## New Diskettes from 3M

A double sided, double density 5¼ inch diskette has been added to the Scotch diskette family by 3M's Data Recording Products Division. The Scotch 745 diskette has an unformatted capacity of a half megabyte. Sector-hole configurations are 0, 10 and 16. The rated density is 48 tracks per inch and 7958 bits per radian. Improved surface finish provides cleaner operation and better electrical performance than in previous comparable diskettes, 3M says. The 745 has a reinforced hub to promote reliability and long life. The new Scotch diskette has a suggested list price starting at \$7.30, depending upon quantity and packaging. Further details may be obtained by writing to Dept DR81-4, Box 33600, St Paul, MN 55133

Circle 101

## New Computer Directory

The BLUE BOOK is a directory of computer manufacturers, peripheral equipment manufacturers and suppliers, software sources, books and magazines, software media, and virtually any computer related product. The BLUE BOOK takes up where other directories leave off. Anyone with a computer related product may advertise in the BLUE BOOK. It is published annually and distributed nationally. The BLUE BOOK is indexed by computer type, manufacturer and product. Even software authors with a single listing are indexed. For further information on the BLUE BOOK, write or call: 1510 South 97th Street, Tacoma, WA 98444 (206) 537-8155

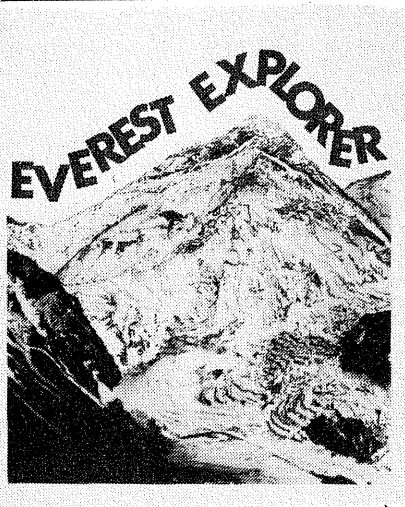
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**Circle 103**



**New Simulation Game**

Acorn Software Products, Inc., announced the release of EVEREST EXPLORER, a simulation game for the Radio Shack Level II. Assigned an expedition budget, the player must select manpower, food, fuel, shelter and oxygen supplies needed to support the climb. Weather conditions, choice of route, climbers' condition and morale all play key roles as you accept the challenge of one of life's most dangerous ventures. Available for TRS-80 Model I Level II, 16K for \$14.95 on tape. The 32K version, including a "save game" option and other enhancements is \$20.95. Contact Acorn Software Products Inc., 634 N Carolina Ave SE, Washington, DC 20003

**Circle 114**

**Stock Market Pulse**

Max Ule & Co Inc is introducing Stock Market Pulse, a new service that instantaneously computes and displays the Dow Jones Industrial Average on a personal computer. Stock Market Pulse is a new optional feature of Tickertec, the computerized stock market quote system without a 15 minute delay. This new service is offered to purchasers of top of the line versions of Tickertec, recently

described by Fortune Magazine as the "Tapewatcher's delight". With Stock Market Pulse, Tickertec computes the Dow Jones Industrial Average and displays continuously this widely accepted market indicator with the net change from the previous day's close on a personal computer. This service is available for versions of Tickertec designed to run on the Radio Shack TRS-80 Model II and other computers that use the CP/M operating system. For a free brochure on Stock Market Pulse and Tickertec, call Max Ule & Co, Inc, the distributor, toll-free at (800) 223-6642, in New York call (212) 687-0705.

**Circle 115**

**Communication Packages**

Small Business Systems Group of Westford, MA has a complete line of communication packages developed by Lance Micklus and designed for use with TRS-80 microcomputers. These packages interface with any time sharing computer which communicates in ASCII. The family of products offers communication capabilities to users with even the most minimal hardware configurations. There has been wide interest in these products from communication "buffs", the educational community, businesses needing to provide linkage between departments and/or divisions, and those who need to communicate with large computers on a regular basis. For further information contact Small Business Systems Group, Inc, 6 Carlisle Road, Westford, MA 01866 (617) 692-3800

**Circle 116**

**Internal Audio for Model III**

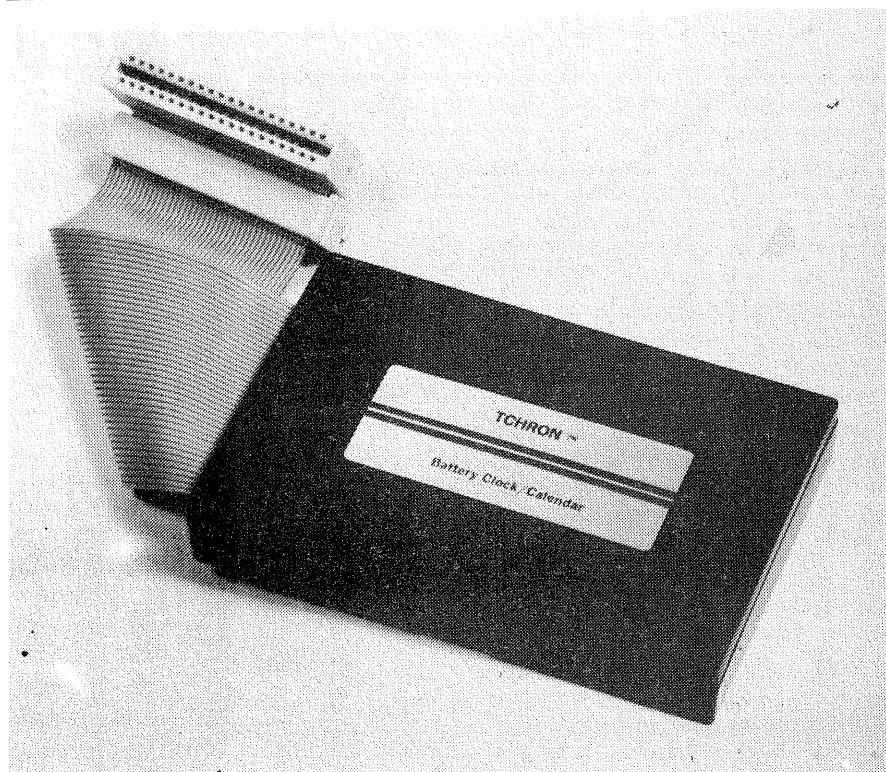
The TCS Systems Model AD-III, 1 watt audio amp adds high quality internal sound to your Model III computer. It is designed with a switching system that de-activates the amplifier during tape data transfers, to eliminate patching external amplifiers or modifying tape recorders. Installation consists of six quick connections to the CPU board, mounting the amplifier and speaker and you are up and running with hi-quality sound. Includes amplifier board, speaker, hardware, all wiring, simple to follow instructions, and 90 day free replacement warranty. Price is \$19.95 from: TCS Systems, Rt 4 Box 12A, Lake City, FL 32055 (904) 755-3599

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**Clock/Calendar for Mods I & III**

TCHRON, by WEB International, is the first complete, compact, self-contained real time clock for the TRS-80 that never sleeps. It has its own "keep alive" power supply, which allows it to continue to run when your TRS-80 is turned off, or experiences a power failure. When you turn on your computer or power is restored, TCHRON will provide instantaneous MO/DATE/YR, day of week, HR:MIN:SEC and AM/PM information. TCHRON retails for \$99.95 and may be purchased directly from WEB International or through their dealer network. They expect to introduce a TCHRON model for the Model II also. Direct inquiries to: WEB International, PO Box 96, Corona Del Mar, CA 92625 (714) 494-2869

**Circle 107**



# n o t e s

Model II users: While in Basic it is possible to generate an I/O error when you call for your printer if you forgot to turn it on or it was not selected. If this is the case, correct the printer fault (turn it on, plug it in, whatever) and CONT the program. TRSDOS will automatically reinitialize the printer and the program will continue. However, if your program error traps, it is possible that you will find yourself out in left field. The same is true if you needed a special FORMS configuration.

When entering long data statements, I always add a checking routine, numbered above the last line in the program. For example:

```
50000 FOR X=1 TO 100 : READ D
50010 PRINT X;"=";"D;" ";
50020 SS=SS+D : NEXT
```

In the case of some programs, the FOR loop should start with zero and should be made larger than the largest number of data elements. After entering each data line, I type RUN 50000, and get a listing which is easy to check against copy. When it runs, you get an OD ERROR message which you ignore. The SS provides a check sum, which you examine by typing PRINT SS. I would like to suggest that all authors of programs with lengthy data statements provide, in a REM statement, the number of items and the check sum after each DATA line.

-Ralph Nottingham

Ralph Nottingham also wrote of a problem which may have bugged some of you at one time or another. Having entered about six lines of Leo's Line Packing article of last issue, he saved the program and then typed EDIT255. The computer indicated there was no such line number. When he typed LIST250—, the program listed properly. When he tried to list or edit 255, however, he couldn't find it. Clearing the memory, and reloading the program didn't solve the problem.

We ran into this many moons ago. Somehow, a glitch changed a bit in memory and caused a similar problem. In our case, a bunch of garbage appeared between lines while listing a program. In calling the program back from disk, it was still there. The only way we could get rid of it was to start completely over. And ours was a long program! It is generally felt that the Basic Pointer gets fouled up and points to the wrong spot in memory.

Line glitches of this nature can come from many sources. One of the most common is static electricity. Another is line noise from a refrigeration unit of some sort.

Model I users: Under some DOS's it is possible to wipe out your disk directory while running a Basic program. How do you do it? Kill a file which has not been closed from Basic. TRSDOS will crash the directory. LDOS, DOSPLUS and NEWDOS80 will not, though the latter will come back with an error message. LDOS simply closes the open file first. If in doubt as to what your DOS does or doesn't do, try the following program:

```
10 X=0
15 X=X+1
20 OPEN"R",1,"TEST1"
25 PRINT "AT 25"
30 OPEN"R",2,"TEST2"
35 PRINT "AT 35"
40 OPEN"R",3,"TEST3"
45 PRINT "AT 45"
50 KILL "TEST1"
55 PRINT "AT 55"
60 KILL "TEST2"
65 PRINT "AT 65"
70 KILL "TEST3"
75 PRINT "AT 75"
80 CLOSE
85 PRINT "ROUND # ";X
90 GOTO 15
```

-Dr Bruce Armstrong

Here is one of the quickest memory tests on record. While not fool-proof (is anything?), it will run equally well on the Model I, II, III and Color Computers. Type in the following *without spaces* and RUN it:

```
1PRINTMEM:GOSUB1
```

The computer will display a rapidly descending number on the screen. This is the amount of memory left as the stack fills with the instructions for executing a RETURN statement (which it will never find). At the conclusion of the test, if properly executed by the computer, the program will crash with an OUT OF MEMORY message and the number will have reached something around 50 or 60. This varies with computer and memory size at the beginning of the test.

Should there have been a glitch in the memory, the program will (usually) crash with some other error message or freeze and lock-up.

The programmer may find it advantageous to include a line similar to the one below to maintain consistency of file name, drive, etc., when saving the latest updated version of his program:

```
59999 STOP
60000 CLS : PRINT"SAVING PROGRAM" : SAVE
"PROGRAM:X"
```

X=Drive# and line 59999 avoids cashing into the SAVE command. To use, simply type: "RUN 60000".

-Donald J Goodwill

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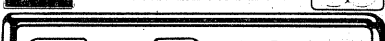
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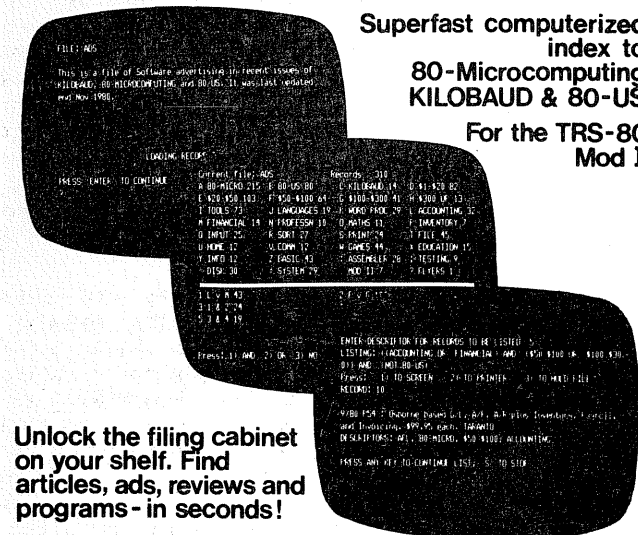
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**Notes**

Model I users: Did anybody ever mention that SCRIPSIT works great as an editor? Here is the sequence:

- (1) Save the BASIC program to be edited in the ASCII format
- (2) Load SCRIPSIT
- (3) Load the program to be edited
- (4) Edit the program
- (5) Save the edited version with the ASCII specifier (S,A)

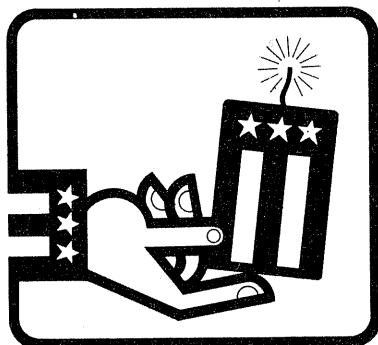
And now you have an edited version of your Basic Program. This is especially handy if you have to do any global changes, such as changing PRINT to LPRINT or visa-versa.

If you are having problems getting results with double precision addition, subtraction, and so forth, try the following program to determine which works for you. Each Model of the TRS-80 family works a little different. One should work for you. In particular try 8000.22 and -8123 as your values.

```

10 ' PROGRAM TO DEMONSTRATE PROBLEM
20 ' WITH DOUBLE PRECISION ADDITION
30 ' AND A POSSIBLE FIX
40 '
50 CLS
60 INPUT "ENTER A#";A#
70 PRINT
80 INPUT "ENTER B#";B#
90 PRINT
100 C#=A#+B#
110 D#=VAL(STR$(A#+B#))
120 E#=VAL(STR$(A#))+VAL(STR$(B#))
130 F#=INT((A#+B#)*100#)/100#
140 G#=INT((A#+B#)*100)/100
150 LPRINT"A# HAS A VALUE OF"A#
160 LPRINT"B# HAS A VALUE OF"B#
170 LPRINT"C#=A#+B#"
180 LPRINT"RESULTS IN -->"C#
190 LPRINT
200 LPRINT"D#=VAL(STR$(A#+B#))"
210 LPRINT"RESULTS IN -->"D#
220 LPRINT
230 LPRINT"E#=VAL(STR$(A#))+VAL(STR$(B#
))"
240 LPRINT"RESULTS IN -->"E#
250 LPRINT
260 LPRINT"F#=INT((A#+B#)*100#)/100#"
270 LPRINT"RESULTS IN -->"F#
280 LPRINT
290 LPRINT"G#=INT((A#+B#)*100)/100"
300 LPRINT"RESULTS IN -->"G#
310 END
    
```

Notes Cont. On Page 127



**Level II Basic Instruction Course  
Parts I and II  
Radio Shack  
26-2005 and 26-2006**

**\$14.95 and \$19.95  
Model I**

Computer Aided Instruction (CAI) has been an active part of education since the earliest days of keypunching. Nothing is more natural than having a computer teach you how to program a computer, and Radio Shack has two instructional packages in Basic for the TRS-80. Both packages are written in Level II Basic. Part I is for 4K machines and the more advanced Part II package is for 16K machines. All programs are on tape, but can be loaded on disk systems with little effort and no need to rewrite the routines. The programs build upon each other, and you are recommended to work in sequence from lesson 1 of Part I to the end.

The Part I set of programs (\$14.95) consists of four cassettes with 27 different lessons. Radio Shack has greatly improved its educational programs. The routines are well-written, easy to follow, and make good use of graphics and flashing displays. The sequence of instruction is different than that used in most beginning courses, but it presents no great problem. The tutorial on editing seems premature. It seems the READ DATA command should have been presented earlier and the use of the INPUT command should have been saved until later.

The Part II programs cover the following topics: line numbers,

variable types, input, list, run, editing, print formats, evaluating expressions, if then, goto, read data, arrays, loops, for next, special functions, graphics, gosub, on goto and gosub, and restore. The use of graphics to highlight key lines and program execution is excellent, especially in the IF-THEN lessons. It would be recommended that the ELSE command be included at this time but it was not. Also the author's choice of totally random line numbers in their examples was unnecessarily confusing to beginning students.

The Part II programs (\$19.95) continue the instructions for 16K users. This set of four cassettes and eight lessons go into much more detail than the earlier lessons of Part I. Topics are: list, edit, variable types (more extensive than before), arrays, operators and commands, input and output commands, strings and string manipulations, special features (such as ERL, etc.) and machine language subprograms.

These programs were as well developed and carefully written as the Part I lessons. For many of the commands, instruction was by example and was very similar to the Level II Manual. After trying two separate tapes, I was unable to load a good copy of the machine language lesson. The operators and commands portion does a superb job with logical expressions and Boolean Algebra.

All programs use a self-pacing INKEY\$ routine. This allows you to have new information displayed as you are ready. The video formatting is well planned and makes programs easy to follow. The descriptions are clear and concise. At the end of major sections, you are given a multiple choice question. If you are wrong, an explanation is given. If your answer is correct, the reasons the other answers would have been wrong are displayed. This is a nice feature, as very often with CAI material, a student can guess a correct answer, move on, and never really understand the concept.

I plan to make extensive use of the lessons in my computer classes; they are a fine aid to education. If you are looking for a tutoring aid in learning Level II Basic, these are well worth the price. Keep in mind though, that the lessons aim to teach you commands and an understanding of the TRS-80, they do not cover how to write a program.

**Cameron Brown**

**Organ**

**The Byte Miser Software  
720 West Haven Blvd  
Rocky Mount, NC 27801  
\$12 4K tape; \$15 disk  
Models I & III**

Are you an aspiring organist? Do you want to tickle the ivories and see if you can really play a Bach Fugue? Here is your chance.

ORGAN is a machine language program for the TRS-80 Model I or III. It will run in as little as 4K, but requires Level II. The program will allow you to play in real time, press a key and voila' you have music? Well, you do if you plug the cassette output into an amplifier.

As you load the system tape a two manual keyboard will be drawn on the screen. The keys of your TRS-80 keyboard correspond to the relative position of the white and black keys of a small two-manual organ keyboard (you know, the \$69.95 Christmas special). The (screen) keys are labeled with the corresponding keys of your TRS-80 keyboard and when you press any key, an asterisk will appear on the corresponding key represented by the screen.

As with the sound produced by most other programs, the system is capable of producing one note at a time through the cassette output. However, Organ will also allow "chords" to be played as well, by pressing more than one key at a time. The sound will then alternate between the two or more keys pressed at a rate established by a "tremolo" value. This rate remains the same regardless of the number of keys pressed: four notes will take twice as long as two notes to produce. And due to the keyboard matrix arrangement, pressing two or more keys will sometimes introduce additional unwanted notes.

The program has additional features: (1) a loudness control which allows either loud or slightly softer. The range here is minimal. (2) Timbre, or sound quality, which can be toggled between two values, one of which is fixed as kind of a clarinet sound; the other which can be a reedy "Christmas special", to an almost trumpet quality. (3) The value of the second sound quality mentioned in (2) above. This can be any of ten values. (4) The rate of tremolo which can also be any of ten values. The slower rate is smooth in its transition from tone to tone, but does not produce a true chord. The fastest rate, on the other hand, would produce a tone were it

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not for "keying" that has a tendency to introduce a buzzing sound and destroy the effect that otherwise could be had. This can be overcome as Richard Taylor so effectively demonstrated in his version of the William Tell Overture of his TRS-80 Opera program.

Is it worth the \$12 or \$15? The reaction has been a qualified "yes". It does add a new dimension to our TRS-80 and has been a lot of fun. It does not attempt to replace the real thing. But then, it does do as good a job as the Christmas special (except in chording) and offers a wider range of sound.

Clay Caldwell

**Upper/Lower Case Conversion  
Motor Control  
Modification Kits for  
Centronics 779/Radio Shack LP I  
Printers  
Service Technology  
3844 Spring St., Box 1426  
Nashua, NH 03061**

Are you annoyed by the fact that the motor on your printer is constantly running when you're not actually printing something out? And how many times have you lost data on a printout because you turned off the printer to stop that irritating noise and to save juice, and then forgot to turn it back on before your program tried to use it?

Well, Service Technology has a simple modification kit that automatically turns off the printer motor 8 seconds after the last buffer was printed, and then turns it back on the moment your program sends more data to it, without losing any of the data.

This saves wear and tear on the lineprinter, increasing its useful life and decreasing your maintenance costs, and reduces the amount of electricity you need to power your system (not to mention allowing you to do your part to conserve energy).

This modification is very simple to install: It requires only a screwdriver and the ability to follow easy directions and read a simple diagram. It uses a small circuit board that snaps into the back of your printer cabinet, and makes all of its electrical connections by using snap-hooks instead of messy soldering.

Its cost is relatively high, \$95.00, but worth the price in view of the advantages it delivers. Ask for Conversion Kit #2.

The other kit of interest to those who want to use a word-processor with their computer, but who do not have the money to buy a new printer to replace their old one (even allowing for trade-in value, the difference in price is more than several hundred dollars).

Conversion Kit #1 is an uppercase/lowercase modification, which gives your printer the capability of printing the full 96 ASCII character set, with or without a slash through the zero (be sure to specify which one you want when ordering). And its cost is a modest \$125.00.

Like the other kit, this requires only a screwdriver and the ability to follow the directions in snapping out the old character generator chip, snapping in the new circuit board, and attaching the snap-hook connectors to the proper leads.

These kits were designed, and are sold by an ex-Centronics engineer. He worked for them for many years and knows his way around the inside of Centronics printers.

There is one thing potential owners of this last modification should know, and it has nothing to do with the modification itself: If you are planning on using this mod with the Electric Pencil, you may experience some problems. When I used my copy of Electric Pencil with the converted Line Printer I, I ran into constant problems with buffer overflow (usually after the first page), and lost large portions (up to half a line in some instances) of each line output to the printer.

The problem was finally traced to a lack of proper Electric Pencil to lineprinter handshaking. The Electric Pencil was not bothering to check the busy status line from the printer, so that when the printer buffer was full, the Electric Pencil still sent it data, resulting in lost data.

Just to be sure that it wasn't the printer I tried the Electric Pencil with a Texas Instruments 810, and had the same results except that it took place after about 10 pages. As a last test I borrowed a friend's copy of Scripsit and tried it with both printers. There was no lost data.

So, if you use this mod on your printer and you experience this type of lost data problems when using the Electric Pencil, try using Scripsit.

Yvon Kolya

**Missile Attack**  
**Adventure International**  
 Box 3435, Longwood, FL 32750  
 Model I and III, \$14.95 tape and \$20.95 disk

"Missile Attack" is a captivating program modeled after Atari's extremely popular arcade-game, "Missile Command". It is written in machine language by Philip Oliver of the Cornsoft Group, and is sold by Adventure International.

The object of "Missile Attack" is a rather simple one: defend your cities from an enemy missile onslaught. Unlike the arcade game, you have only two missile silos instead of three, and only three cities as opposed to six. You must use your missiles to destroy incoming enemy missiles in the air or else they will hit either a city or a silo and totally devastate them, causing the unfortunate site to disappear in a puff of smoke.

Your two silos are situated at the extreme lower left and right corners of the screen. Before every attack each silo is equipped with 15 anti-ballistic missiles (ABM's). Between the two silos are your cities. At the beginning of the game you are given three cities which are to be defended at all costs. You cannot earn bonus cities to replace ones that have been obliterated, therefore, keeping them in one piece is your prime requisite. The silos, on the other hand, will be rebuilt if you can keep at least one city intact till the end of the barrage.

When the game begins, you start to see the enemy's missiles fill the sky. You maneuver your crosshairs, a plus mark (+), with the four arrow keys. When the crosshairs are positioned where you would like to fire, you press either the @ key or the spacebar, depending on which silo you want to launch a missile from. When you shoot a missile, it rockets across the screen at lightening speed, leaving a trail of smoke, to where the plus mark was and explodes in a burst of fire, destroying anything that is in the proximity of the blast. Each of the enemy's missiles is worth 10 points if it is destroyed. You try to blast the missiles out of the sky as quickly as possible so they don't get too close to your precious cities.

After the skies are cleared, the computer tallies up the number of ABM's remaining in your silos and the number of intact cities. Each missile left after an attack is worth 5 points and each city is worth 100 points. After every other attack you manage to survive, your bonus base point multiplier is increased by one. In other words, a city is worth 200 points after the third attack, 300 points after the fifth and so on. As you fend off more and more attacks the missiles gradually increase their velocity until they reach unimaginable speeds.

The game is over when you, by some stroke of misjudgement or simple bad luck, allow all of your cities to be hit by enemy missiles, thus leveling them to dust. This game will also end if you somehow manage, with the blessings of the gods, to resist 12 enemy attacks. Your sharp shooting will convince the enemy that victory over your country is impossible.

This single-player game comes complete with intensifying sound effects. It also keeps track of the highscore. Some of the elements it does not have that are included in the arcade game are jets and killer satellites whizzing across the screen, and also "smart missiles", which can dodge your missile bursts. Considering the TRS-80's limited graphics capabilities and the few inconsistencies between this game and "Missile Command", this program is a rather good TRS-80 version. "Missile Attack" is likely to become one of the most popular games in your software library and will never sit around collecting dust.

"Missile Attack" is written to run on both the Model I and III TRS-80 and also on the PMC-80. It comes on disk or tape and can be purchased by mail order from Adventure International.

Owen Linzmayer

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*Notes Cont. From Page 122*

By this time most of us have heard of the memory management problems involved with string storage, in terms of reassigning values. The proper use of the INKEY function is important to save memory management. As noted below, both program lines create an effective pause. The major difference lies in the fact that, in line 50, A\$ is reassigned each time the loop is repeated, whereas nothing is assigned at all in 100.

```
50 A$=INKEY$ : IF A$="" THEN 50 ELSE RETURN
100 IF INKEY$="" THEN 100 ELSE RETURN
```

*-Donald J Goodwill*

Making backup copies of your disks is like climbing mountains: If you keep backups it's like climbing up 3 feet and falling back 2. If you don't keep backups it's like climbing all the way to the top and falling all the way down—with a ton of rocks covering you. (Words of wisdom from your illustrious Publisher)

Model II users: Ever have a disk I/O end a program with files open? Or a brown-out cause your Model II to "freeze"? Or for some other reason, you get stuck with files left open that Basic refuses to close?

Under TRSDOS 2.0, the Directory will show open files with a "?" in the filename area. To close that file from TRSDOS (so it can be accessed from Basic) do a LIST filename. This will create an Error 6 condition, but will close the file. The file will now be useable from Basic.

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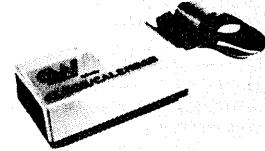


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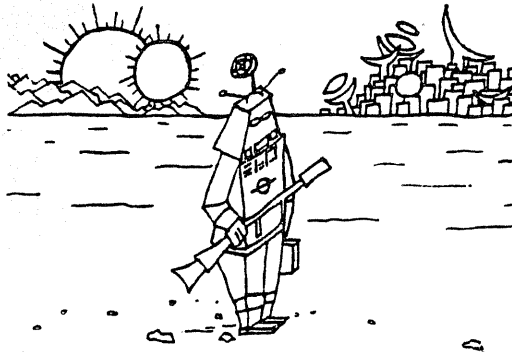
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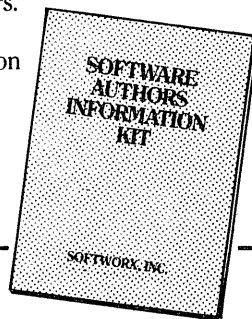
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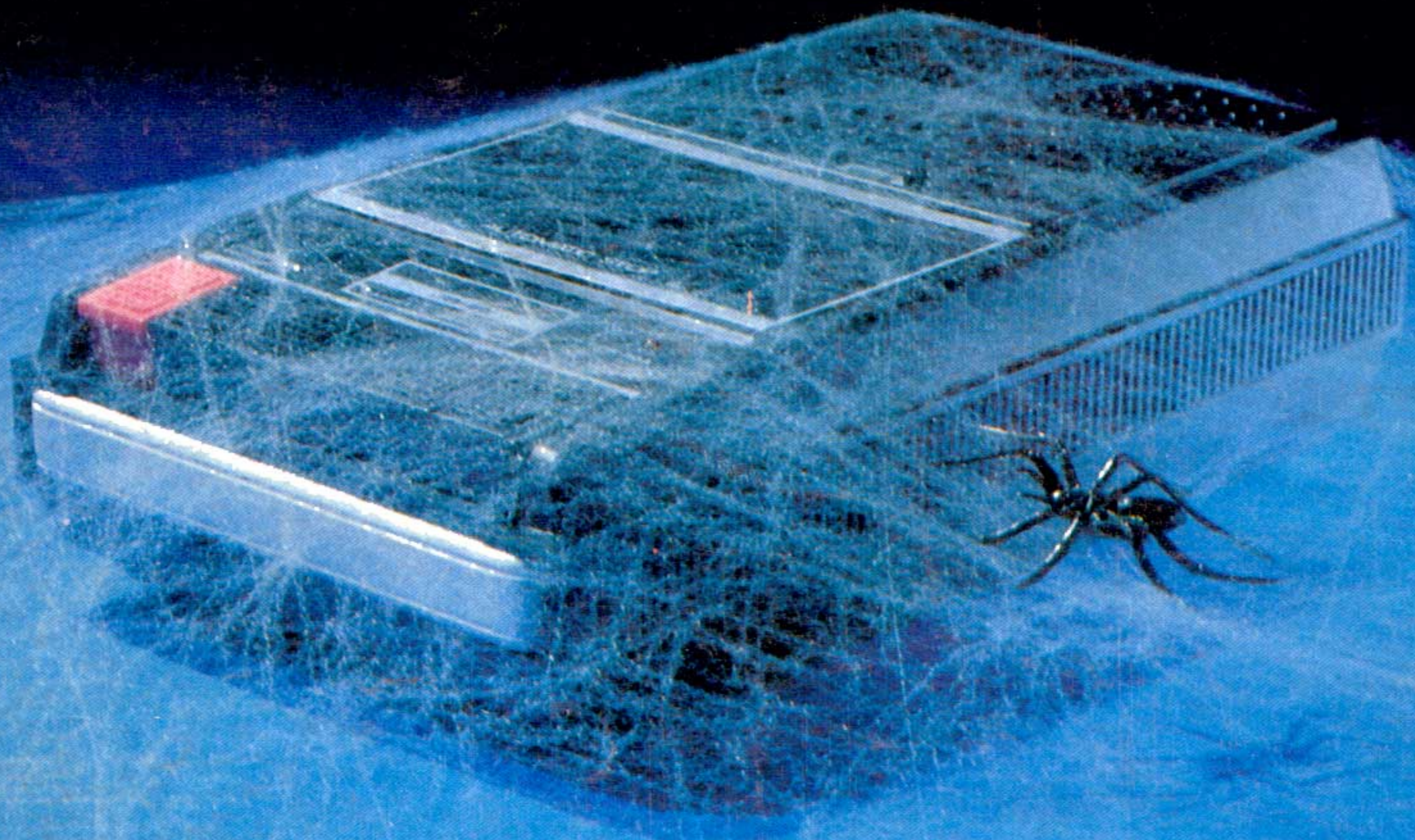
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